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Journal of the Minnesota State Medical Association, Southern Minnesota Medical Association, Northern Minnesota Medical Association, Minnesota Academy of Medicine, and Minneapolis Surgical Society

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# Minnesota Medicine

Journal of the Minnesota State Medical Association, Southern Minnesota Medical Association, Northern Minnesota Medical Association, Minnesota Academy of Medicine and Minneapolis Surgical Society

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#### PRE-OPERATIVE AND POSTOPERATIVE MANAGEMENT OF THE POOR RISK INFANT OR CHILD

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PROPER management of the "poor risk" surgical patient challenges the profound judgment of men in almost every field of medical practice. Although the problems often differ in individual cases, they are, as has previously been pointed out, especially at variance in the extreme age levels. Compared to the adult, the surgical patient in early life has additional hazards due to the factors of immaturity, growth and development.

His immaturity in the first few months and years of life is characterized by unusually active physiologic processes, rapid metabolism, and relative instability with respect to water, acid-base, and nitrogen equilibrium. He is less capable of compensating for blood loss as well as to any tax on his heat-regulatory mechanism. Compared to the adult, his "margin of safety" is therefore appreciably reduced.2,5

The principal causes of a "poor risk" status in infancy and early childhood can be briefly stated as follows:

- 1. Developmental (Immaturity, congenital anomalies)
- 2. Nutritional (Hypoproteinemia and starvation)
- Water balance (dehydration or edema) Electrolyte balance (acidosis, alkalosis) Endocrine balance (thyroid, diabetes) 3. Metabolic -
- Deficiency (Vitamins, minerals, tissue)
- Infections (Active, anticipated contagion)
- Traumatic Injuries, burns
  Anticipated surgical shock
- Allergic (Asthma, edema)
  Mechanical (Foreign bodies, obstructions) 8.
- 9. Psychic

Read before the annual meeting of the Minnesota State Medical Association, Rochester, Minnesota, April 14, 1944.

Although the pathologic physiology of the "poor risk" infant or child varies minutely with the above outlined etiology, and more than one of these mechanisms may operate together, the resulting syndrome is frequently one of imbalance, especially involving protein, fluid, and electrolytes.

It is well known that chronic infections often cause a depletion of protein in the body. Whereas in normal protein metabolism a few grains of nitrogen are lost daily in the urine, in some chronic diseases the destruction of protein becomes excessive. In acute infections, protein levels may have a bearing on survival. The influence of chronic infection is similar even though the results are less dramatic. Moreover, a cycle is often initiated during chronic infections in which diminished protein intake, excessive loss of protein, hypoaminoacidemia, and negative nitrogen balance occur. 6,13,14

Nutritional deficiencies may likewise cause a lack of protein in the form of albumen. Studies reveal clearly that reduced plasma protein is directly responsible for nutritional edema in children whether the primary cause of the hypoproteinemia is prematurity, inadequate feeding, celiac disease, or any process which interferes with normal fabrication of protein.11 When plasma protein and volume are restored, edema promptly disappears. The relative frequency of this condition and its association with malnutrition have been especially emphasized by Dodd.4 There is no

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nt Paul EDICINE doubt that nutritional hypoproteinemia at or slightly above the "edema level," is very common in delicate babies and children with deficiency diseases, and that a prompt restoration of normal levels may alter an apparently refractory clinical course. Infections in the very young are often accompanied or overshadowed by the effects of hypoproteinemia. Plasma can materially help to combat chronic infection and hypoproteinemia in two ways: (1) by its nonspecific efforts on metabolism; and (2) by conferring antibodies contained in adult plasma pools.

For the correction of hypoproteinemia or hypoalbuminemia, amino acids have been said to be effective. Experimental and clinical proof of their ability to restore plasma proteins and achieve positive nitrogen balance has been presented. Their principal indication intravenously is in nutritional deficiency although they have, like plasma, also been found effective in subacute conditions with loss of plasma into the peritoneum in peritonitis, and into the bowel wall in obstruction. Both have been employed in hepatic insufficiency and nephrosis.<sup>6,8,13</sup>

Disturbances of fluid equilibrium, especially dehydration in the sick child, are frequently of greater importance than the underlying disease itself. This is true because of the relatively greater susceptibility of children to the effects of changes in volume and character of body water.

The small child has a greater percentage of water in his body than the adult and a greater partition of this is extracellular (i.e., intravascular and interstitial), where it serves to maintain plasma volume. He, therefore, often loses proportionately greater amounts of fluid during dehydration than an adult. Prompt fluid replacement and maintenance are therefore more urgent in the sick child. 1,3,7 In the case of simple dehydration, normal saline and glucose or Hartman's solution may be employed. A dosage schedule for rehydration and normal intake is shown in Table I.

#### TABLE I. TREATMENT OF DEHYDRATION (SEVERE)

|             |   | dration            |
|-------------|---|--------------------|
| Pre-school- | 60 c.c. per lb.<br>-45 c.c. per lb.<br>c.c. per lb. + {30 c.c. per lb.  |                    |
| Example:    | Baby 10 kilo or 22 lbs. × 90 = 1980 c.c. 1st 2<br>Thereafter 22 × 60 = 1320 c.c. per 2<br>(One-third by Intravenous Drip) | 4 hours<br>4 hours |

If protracted vomiting has been a prominent symptom in a child, alkalosis is suggested by the occurrence of shallow respiration, hypertonicity, lack of chloride excretion, and a high plasma bicarbonate level. The therapeutic need in this circumstance is saline solution, and calcium gluconate or chloride followed by plasma or blood intravenously as shown in Table II.

#### TABLE II. TREATMENT OF ALKALOSIS

(Vomiting of Pyloric Stenosis, Intestinal Obstruction, Fistula, and Alkali Administration)

SODIUM CALCIUM CALCIUM CHLORIDE or GLUCONATE

PLASMA or BLOOD

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If diarrhea, with loss of basic intestinal secretions, has occurred, reduction in plasma bicarbonate may have reached an extreme. Hemocytoconcentration and circulatory stagnation then cause impaired renal function. Exhaustion of carbohydrate reserve and anoxemia permit intermediate products of fat metabolism and acids to accumulate in the blood. The resulting acidosis, if unchecked, may then lead to an increase in capillary permeability and be manifested by stupor, hyperpnea and symptoms of shock. Such a seriously altered physiologic state can best be corrected by the intravenous administration of glucose and buffered sodium lactate or sodium bicarbonate, followed by a protein colloid such as plasma. Rehydration, antiketosis, restoration of carbohydrate reserve and plasma volume are thus brought about. The treatment of acidosis is outlined in Table III.

TABLE III. TREATMENT OF ACIDOSIS

(Diarrhea, Fistula, Diabetes, Nephritis, Severe Infections, Convulsions, Heart Disease)

I.V. 

SODIUM LACTATE and SODIUM BICARBONATE + (HARTMAN'S SOL.) Lactate Ringer's + PLASMA or BLOOD

Restitution of plasma volume will tend to increase renal function. Fluids containing buffer substances may then be held in the blood stream so that the selective action of the kidneys may come into play and a sustained trend toward proper water and electrolyte balance can be achieved. Dosage of alkalies that can be used for this purpose is shown in Table IV.<sup>9,10</sup>

From a relatively simple beginning, any one or a combination of these altered physiologic conditions, accelerated by infection or other factors, may rapidly approach a critical state. Much of TABLE IV. DOSAGE

Weight in pounds X
(Normal — Actual CO<sub>2</sub> Combining Power)

= CC Isotonic (6th Molar) Sodium Lactate (or 6th Molar Sodium Bicarbonate) 1.5%

Example:
Baby 10 kilo or 22 lbs.
CO<sub>2</sub> Combining Power = 35 Vol. %
Normal Combining Power = 55 Vol. %

Vol. %

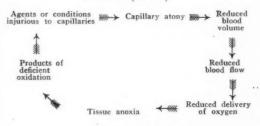
Diff. = 20

Vol. (22 lbs.) = 440 c.c.

the mechanism of secondary or "medical" shock then develops. Confirmatory evidence of shock is found in abnormally high values of hemoglobin, red blood cells, hematocrit and specific gravity of the blood.

More dramatic and urgent than secondary or medical shock is the rapidly progressive primary shock precipitated especially by trauma, hemorrhage and burns. Moon and 12 and others have shown that plasma escapes through the capillary walls into the tissues in all types of shock and that diminution of blood volume then results. While the intimate nature of shock is not yet entirely clear, and some disagreement still prevails concerning the neurogenic, vasogenic, and hematogenic roles involved, the following schematic presentation by Moon serves to present many of the stages in its pathogenesis.

TABLE V (MOON)



Increased permeability of the capillaries and plasma loss are attended by reduced blood volume, capillary dilatation, hemocytoconcentration, lowered venous pressure, reduced cardiac output and volume flow, anoxemia, and tissue anoxia. If these changes continue and are not recognized by clinical and laboratory means, a subsequent fall of arterial blood pressure occurs and an irreversible state may develop rapidly. Plasma can interrupt this process if given in time, by increasing the circulating blood volume and improving vascular tone. Fluid is thus drawn back from the tissues due to increased colloidal osmotic pressure, and the improved blood volume helps to re-

verse the cycle. Some observers prefer concentrated plasma for this purpose.

Investigators of the causes of disruption of abdominal wounds have pointed out that experimentally and clinically a state of hypoproteinemia may be one of the factors which retards normal healing.15 Dogs, in which a state of protein deficiency was induced were subjected to abdominal laparotomy. In most of these, disruption of the wound or failure of the incision to heal was observed. Subsequent experiments demonstrated that normal healing of the wound occurred when the hypoproteinemia was controlled by intravenous infusion of plasma. Concentrated plasma is thought to have two advantages: it rapidly corrects the deficiency of blood proteins, and, being a hypertonic solution, increases the osmotic pressure of the blood and tends to overcome any tissue edema which may be present.

Rapid extensive hemorrhage may be a cause of "poor risk." Hemorrhage causes dilution of the blood, loss of extra-vascular fluid, dehydration, and distorted fluid equilibrium. Since the immediate need in severe hemorrhage is restoration of blood volume and pressure and because typing and cross-matching are unnecessary when pooled plasma is employed, it would seem more expedient and safer to use plasma for the hemorrhagic emergency and replace blood cells by transfusion subsequently, if the hemoglobin level is appreciably reduced.

Obviously, no comprehensive formulae can be evolved to determine the requirements of all factors in a mechanism so complex and precipitated by so many causes as the failing circulation of the sick child. Clinical judgment to determine the need for specific and group antibodies, for fluids, for electrolytes, and for protein sufficient to maintain an adequate circulating blood volume is all-important. Evaluation of hydration, determination of plasma protein, bicarbonate and chloride, the number of red cells, the hemoglobin, hematocrit, and specific gravity of the blood are invaluable adjuncts. Katherine Dodd4 has stated the principle exceedingly well: "In a child taking inadequate food and not receiving transfusions, a gain in weight, accompanied by an increase in hemoglobin and a decrease in plasma protein, means that plasma fluid and protein are being lost from the blood stream."

The dosage of human plasma and serum must depend on the weight of the child and the serious-

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ness of the condition for which it is to be employed. For the transfer of specific antibodies in prophylaxis and treatment of communicable disease, doses of 10 c.c. to 100 c.c. are usually given. In chronic infections and hypoproteinemic states, doses should be gauged to accomplish physiologic levels of plasma proteins. For the sake of illustration, a computation of approximate protein need in a 10 kilogram baby whose plasma protein level is 5.3 grams per 100 c.c. of blood is appended.

#### TABLE VI

| Plasma protein (patient) | = 5.3 gm./100 c.c. blood  |
|--------------------------|---|
| Plasma protein (normal)  | = 6.7 gm./100 c.c. blood  |
| deficit                  | = 1.5 gm./100 c.c. blood  |
| Weight of patient        | = 10 K  |
| Blood volume (8%)        | = 800 c.c.  |
| Deficit 8 × 1.5          | = 12.0 gm.  |
| A A Minimum (X Fa        | to 200 c.c. plasma (approx.) ctor = Depleted reserve ctor = Maintenance |

Time and space do not permit considering all pre- and postoperative management in detail. One should not fail, at least, to mention the use of high vitamin intake, specific drugs, oxygen, tubes for decompression, and careful judgment in the choice of anesthetic and time of operation.

A cannula in a vein for prompt use of plasma, especially during operations on the brain or thorax, may be life saving.

Finally, let me urge that careful mental preparation be employed, when possible, in every child who must come to surgery. Serious psychoneurosis, an all too common postoperative "poor risk" complication, may be avoided by this means.

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#### PRE-OPERATIVE AND POSTOPERATIVE CARE OF AGED SURGICAL PATIENTS

OLOF I. SOHLBERG, M.D., F.A.C.S.

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T IS true that surgery on the aged is more serious than on young people. On the average, it is eight times as dangerous to operate upon a person over fifty as upon one younger.6 However, people do not age chronologically nor do their tissues age equally.4 Many older people are greatly handicapped by bad habits of eating and of thinking. 5,11,12,18, I will not go into the physiology of aging. Others have done this far better than I can, and it is well known to you.4

#### Pre-operative Care

A most careful history and evaluation of the · physical condition of the patient is even of more

importance in older people than in younger. A detailed personal history, supplemented by a history from relatives, is very important. This often takes infinite patience and an astute sifting of the chaff from the wheat. However, it will pay richly in evaluating the patient and gaining his confidence. A few questions about his forebearers will often reveal the kind of stuff he is made of and greatly aid in prognosis and preparation.

Many old people will refuse operation on the plea of age, uselessness to others and so on. If these people can be assured that help is not only possible, but probable, and that their recovery is desired by everybody, a happier frame of mind is induced. They must be led, not driven. A hope-

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ful, trusting patient, who wants to get well has been more than half prepared. A properly-trained nurse, accustomed to handling old people, is invaluable.

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Remember that older people have developed a "habit of living," a resistance to infection and an ability to stand pain or an indifference to it<sup>14</sup> that stands them in good stead. On the other hand they often follow food faddists and develop habits of diet that are bad. A common result is a low protein intake, with its anemia and debility-producing results.<sup>15</sup> Low vitamin intake is common<sup>8,11</sup> with resultant poor healing and poorer prognosis. It is often amazing what some of the commercial concentrates of B and C will do to induce a sense of well-being. You all know the importance of vitamin C in healing of tissue.<sup>11</sup>

The less departure from an older person's routine the better. The older one gets the more he loves routine and established things. The feeling of insecurity in children is only matched by that in the aged, and requires a corresponding assurance of belonging, of being wanted, and of being useful.

Most deaths in old people are primarily due to circulatory failure. A test of the circulation and cardiac reserve should be made. This is difficult but is of the greatest importance. The history of the patient's parents and relatives, and of his own physical activities and his response to them, as well, are of great value. Pulse, blood pressure, a chest plate and an electrocardiogram will give much additional valuable information.

As to the kidneys, the simple tests for sugar, albumen and the sediments, as well as the ability to concentrate and dilute the urine will usually suffice for that department. The lungs are hard to evaluate. Many of the secondary effects of emphysema are often present due to loss of elasticity<sup>†</sup> of the lungs even though a true emphysema is not present. Infections, even pneumonia, may be present with but few objective findings.

Oral hygiene as a prophylactic of suppurative parotitis is worth attending to. The nutritional deficiencies, anemia, low serum protein and so on, indicated previously, must be corrected.

Thewlis in his book on "Care of the Aged" recommends digitalis pre-operatively in almost all serious operations on the aged. Many others do not agree<sup>8,9</sup> and I am inclined to concur. But I do believe that Borg is right in his use of quinidine<sup>3</sup> and I think I have saved some lives thereby,

as a frequent cause of cardiac failure is auricular fibrillation.

So you see, although definite principles must be born in mind, extreme individualization in preparing these aging people for surgery is important.

#### Postoperative Care

After surgery on aged or aging people the utmost care is required. Here, too, an experienced, tactful nurse is worth everything and may mean the difference between life and death. For years I have been advocating early activity postoperatively. Nowhere is it more important than here. Old people fail rapidly in bed. These people must if possible get out of bed the day of the operation. That this is not dangerous to the wound I can assure you from personal experience and from that of many others. 8,9,10 This also has a most wholesome psychological effect and I believe definitely reduces the chances of embolism.

Transfusions preferably, or if blood is not available, the use of plasma intravenously, help marvelously. Fluids must be kept up and the high carbohydrate content of the liver provided for pre-operatively must be maintained. A good rule, as far as fluid intake is concerned, is to not allow the urinary output to fall below 1000 c.c. per twenty-four hours. Early feeding decreases gas pains by stimulating peristalsis8,10, which lessens danger of ileus and mesenteric thrombosis. The chewing decreases chances of parotiditis. The bladder should be watched. Due to decreased sensitivity, aged people often will permit the bladder to get tremendously distended without knowing it. The telescopic memory of old people makes their own perceptions not reliable. A good rule to follow is to have the patient void or be catheterized every eight hours. Over-distention of the bladder does far more harm than catheterization.16

Old people have an inactive heat regulatory mechanism. To avoid a burden on their circulatory systems, see that their extremities are warm. This also avoids fatigue and delayed shock. Massage of the extremities and mild daily exercise are aids in maintaining peripheral circulation and a sense of well-being.

For the relief of pain nothing is better than opiates but on account of their depressing nature must be given with care. Accompanied by strychnine the danger is a great deal less. Restlessness is best controlled by oxygen. Oxygen is in fact

the most valuable aid to the circulation and I give it almost routinely in old people postoperatively as a prophylactic. Alcohol in small doses has a good euphoric effect and is a fine sedative. Barbiturates are often dangerous.1 They make cooperation difficult and are often alarmingly depressing. Try to keep the patient in his own familiar routine as much as possible. Avoid unnecessary irritants. Treat him as an important, necessary member of society, who is going through an ordeal to again become useful. The care of the aged surgically is trying, calls for much attention to detail, co-operation of everybody-doctor, nurse, relatives and hospital authorities. But I think nothing will give one more real satisfaction than the triumphant recovery of a bad-risk, aging patient.

#### References

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#### PRE-OPERATIVE AND POSTOPERATIVE CARE OF THE BAD RISK PATIENT

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PATIENT may be a bad surgical risk and A the cause of the hazard easily recognized. In other poor risks only careful routine screening will reveal the unsuspected danger. Many of these patients have margins of safety so narrow that they must have the benefits of wellplanned pre- and postoperative care if they are to survive.

In spite of the fact that most of us subscribe to the popular belief that the biochemical and physiological aspects are all-important, we must not lose sight of the old hazards which rise repeatedly to harass the surgeon and destroy the patient. The ultimate of perfection in surgical technique has not been reached; nevertheless, it seems safe to say that more may be expected from constructive pre-operative and postoperative therapy than from improved surgical design. The present trend centers attention on methods of improving and restoring the resources of the

Failure to use adequate pre-operative and postoperative care can never be excused because the surgery is urgent or because the laboratory facilities are beyond the patient's means. It is well to note the need for a cost analysis of the laboratory facilities in many of our hospitals. Very often the charges for blood, fluid, and tissue studies add a tremendous burden to a patient with a limited income.

The pre-operative and postoperative routine of a surgical service should be formulated in writing, carefully studied by all members of the service, constantly reviewed, and frequently reedited. Familiarity with these routines facilitates their use at the earliest period in the patient's hospital stay.

No attempt will be made to analyze all the attributes of the bad-risk patient or to present them in the order of their frequency or importance. I shall confine myself to a few subjects which have occupied my attention recently and which I consider worthy of emphasis at this time.

#### Anesthesia and Oxygen Therapy

The question of the choice and method of administration of anesthesia is omitted only be-

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cause it is actually a part of the operative procedure.

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I have been impressed by the improvement in the immediate postoperative care which has evolved in our hospital under a well-supervised anesthesia service. There is little doubt but that the first hour or two following operation is a very critical time. Unless there is close co-operation between the anesthetist and the resident and nursing staffs, there will be a period where the responsibility is divided and the patient may suffer.

In poor-risk patients the use of oxygen by mask, tent, or nasal catheter may contribute greatly to the patient's well-being. During this early period aspiration and atelectasis are likely to have their inception, and usually these may be avoided by improving the immediate postoperative care. The salubrious effect produced by timely oxygen administration is many times very startling. This is especially true in thyroid disease, particularly in those hyperthyroid states in middle-aged patients whose cardiac reserves are exhausted and whose livers have suffered depletion from prolonged metabolic dysfunction. The use of oxygen is equally impressive in certain patients who are recovering from operations on the biliary tract. Many of these patients have inefficient livers because of repeated upsets of liver function and chronic recurrent diseases of the biliary tract. In these cases anoxemia is most undesirable. The efficiency of the liver may be greatly enhanced by the early administration of oxygen together with intravenous glucose therapy. The addition of adequate amounts of vitamin K may be helpful and even life-saving if jaundice has intervened.

#### Liver Efficiency and Hypoproteinemia

It is needless to emphasize that every effort should be made to fortify the liver pre-operatively by a well-planned dietary regime. The value of a high-carbohydrate, high-vitamin intake is of first importance. A selective protein intake should be given to insure against hypoproteinemia. In the presence of a properly functioning liver, oxygen therapy has a salutary influence on the fluid balance of the body. Oxygen plus an efficient liver will induce proper oxidation of the carbohydrates present, forming carbon dioxide and water. The carbon dioxide acts as a stimulant to the respiratory center, and is

eliminated through the lungs. The water is excreted through the kidneys, taking with it various metabolites. The existence of anoxemic states may lead to hyperglycemia and glycosuria, and the liver may suffer a glycogen deficiency.

Any patient who has a well-marked anemia should be regarded as a questionable risk for surgery. We are thoroughly familiar with the diminished oxygen-carrying power of hypochromic and cytopenic anemias, but probably not as conscious of hypoproteinemias and tissue protein deficiencies as their importance would warrant. The term protein deficiency is more appropriate than hypoproteinemia because the latter is a description of the circulating proteins which merely mirror the total protein depots of the body. Only when there is sufficient depletion of tissue proteins do the circulating proteins manifest themselves as a hypoproteinemia. The ratio of tissue to circulating proteins is considered to be thirty to one; therefore, any decrease in plasma protein implies a depletion of tissue protein many times greater. That is why a fall in protein in a surgical patient having an initial hypoproteinemia is much more significant than a similar fall in a patient with an initial normal level. For the same reason treatment of the hypoproteinemia as such with blood and plasma proteins produces a slow response in plasma protein levels. The tissue protein deficiency must be satisfied first before the plasma protein levels offer an accurate index.

Recent studies of this problem in the Hoekton Institute of Cook County Hospital have shown the value of establishing normal levels in patients who are being prepared for major operations. Hypoproteinemia is common in patients with peptic ulcers (especially bleeding peptic ulcers), carcinoma of the gastro-intestinal tract, bowel obstructions, lesions of the biliary tract, gastro-intestinal fistulae, and burns. Surgery produces an average loss of 5 per cent of total plasma protein in normal patients, an average 12 per cent drop in hyperproteinemic patients, and a 5 per cent increase in hypoproteinemic patients. This increase in hypoproteinemic patients is probably due to the energetic use of blood transfusions. Carcinoma of the colon, bowel obstruction, and generalized peritonitis produce the largest decrease in plasma proteins from 18 to 25 per cent. We accept arbitrarily 6.00 grams per cent as the upper limit of hypoproteinemia. Complications of hypoproteinemia, other than death, are impaired wound healing and generalized edema (including edema of the tissues, brain, and gastro-intestinal tract), leading to poorly functioning enterostomies, anorexia, restlessness and irritability, and asthenia.

Whole blood produces a greater rise in protein levels than does plasma. This may be attributed to hemoglobin as a source of protein. In a patient with a hypoproteinemia, depletion of the tissue protein depots must be assumed, because it takes at least 2000 c.c. or more of whole blood to produce any consistent elevation in total plasma protein levels. However, there is a striking improvement in the plasma protein levels when amino acids, combined with whole blood, are given parenterally. Here the amino acids are probably utilized for the tissue proteins, and the whole proteins-blood or plasma -add essentially to the circulating proteins. These findings suggest that a very determined effort should be made to correct protein deficiencies in all patients who undergo major surgery. The correct use of whole blood, plasma, amino acids, dextrose solutions, and saline solutions must depend on frequent observations of the patient's total plasma protein levels, hematocrit readings, and hemoglobin estimations. Again, I should like to stress the point that in patients with protein deficiencies transfusions of less than 2,000 c.c. rarely bring the total plasma protein levels up to the minimal requirements.

#### Vitamin Therapy

We have mentioned wound healing and the reparative processes which accompany gastric and intestinal anastomoses. These processes are a function of the tissue protein depots of the body as reflected by the plasma protein levels of the blood; however, they also depend upon the efficient levels of others factors. It is of little avail to saturate a surgical patient with protein if the lack of these other factors is not adjusted. It has been demonstrated repeatedly that low vitamin C levels manifest themselves histologically by the lack of collagen, which is a basic substance of tissue repair. With this defect in collagen production the architecture of the healing wound is disturbed. The work of Allen Hunt demonstrates that vitamin C deficiency has a widespread effect on tissue healing. He states:

"The proliferation of fibroblasts, at first apparently normal in rate, continues so long as the scar production is abnormally retarded. The cells remain immature. Blood vessels do not readily penetrate this ill-formed granulation tissue. Hematomata are not organized or absorbed, and the scar becomes split up by further extravasations of blood-stained edema fluid. The phagocytosis of damaged tissues is delayed, and the supporting structures bordering upon the incision are not satisfactorily incorporated in the newly-formed scar. These secondary effects may well be due to a disturbance of the blood supply or vascular permeability, but this is itself directly or indirectly due to the deficiency of vitamin C."

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Observation of patients who came to our service with histories of restricted diets over long periods has focused our attention on the importance of the pre-operative administration of vitamin C. These diets were notably deficient in vitamins. On carefully checking these patients before operation, we found that a great many had vitamin C levels approaching subclinical scurvy. In 1938 we began to study the relationship of the vitamin C levels to wound repair.2 We found that the administration of vitamin C led to a much smoother convalescence, and much firmer wound repair, and fewer wound disruptions and serum extravasations. It has been our practice to determine vitamin C levels as soon as the patient is admitted. When subnormal levels are found, we begin intensive administration of large doses of vitamin C intravenously. A thousand milligrams of Vitamin C\* are given daily, preferably in divided doses in the preoperative intravenous glucose or salt solutions. These are supplied by the slow drip method. This type of management is predicated on the fact that there is a very low renal threshold for vitamin C. Its rapid elimination from the blood may be minimized and the effective rate of tissue absorption increased by prolonging the period of administration. If a single dose of 1,000 milligrams of ascorbic acid be given intravenously, the blood will show a five milligrams per cent level during the first hour; but this will fall within five hours almost to the preinjection level. The ability of the tissues to absorb and store vitamin C is limited as to rate, and it is suggested by students of this problem that tissue saturation, even with very

<sup>\*</sup>Vitamin C (Cevalin, Eli Lilly & Co.), 5 c.c. contains ascorbic acid 500 mg. representing 10,000 U.S.P. or International units of Vitamin C. Injected subcutaneously, intramuscularly, or intravenously.

large doses, cannot be attained before five to seven days. This is not to be construed as a reservation that patients will invariably need five days pre-operative preparation, because the most acute need for collagen efficiency occurs when the sutures which have been inserted begin to cut through and lose their supportive strength. This period is probably somewhere between the third and fifth postoperative days. Thus in a patient with a very low vitamin C level, tissue saturation could be attained at the time of greatest need if the patient were placed on a high vitamin C regime immediately on the decision to operate or upon his admission to the hospital.

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#### Vitamin K

Previously, mention was made of vitamin K therapy. Much has been contributed by experimental and clinical work with vitamin K substances, whose essential value lies in their ability to raise the prothrombin level of the blood. The oral administration of vitamin K substances presented the problem of poor absorption in patients whose intestinal bile was greatly diminished or absent as a result of obstruction or diversion. Synthetic vitamin K substances were developed which made parenteral administration the method of choice. The remaining obstacle to the proper utilization of vitamin K is an inefficient liver. The liver must synthesize the vitamin K substances into prothrombin and an efficient liver is essential to this conversion. Serious liver impairment would handicap vitamin K therapy when it might be most needed. Recent contributions to this subject encourage us in the belief that prothrombin in a stable form may be isolated and administered as such, thereby bridging the gap of the inefficient liver. The direct introduction of prothrombin by liberal, fresh, whole blood transfusions has been our only solution to date. It must be kept in mind, however, that the prothrombin content of stored blood or blood exposed to light may quickly be dissipated.

#### Old Age

The ability of the aged to undergo major surgery is frequently underestimated. Old age has no constant for mental or physical stability, nor is it a reliable measure of operability. Because tissue vitality is reduced by a varying degree of cellular atrophy, we are led quite naturally to associate old age with bad risk; but many reservations must be made. Each year finds more and more patients in the sixth, seventh, and eighth decades of life requiring surgical operations. The risk may be estimated only by an individual study of each patient. The most common problems in the old age group are: (1) avitaminosis due to enforced or selective habits of diet and to poor absorption; (2) cardio-vascular-renal diseases associated with arteriosclerosis, hypertension and myocardial impairment; (3) acute upper respiratory infections; and (4) chronic respiratory diseases. The latter are generally divided into (a) chronic emphysematous anoxemic type, (b) accumulative and productive varieties of bronchiectasis and bronchitis.

Diminished healing capacity is not outstanding in elderly patients, but is much influenced by the circulatory efficiency and vitamin levels. The same measures which help alleviate the tissue deficiencies in the aged also help prevent the postoperative complications peculiar to old age, namely, pulmonary infections or edema, thromboses, and renal failure. Vitamin B-Complex,\* Vitamin C, and Vitamin A (100,000 units daily) are given in large doses before and after operation. Tissue anoxia, which is a concomitant of emphysematous lungs and impaired circulation, is relieved by the maintenance of bodily movements postoperatively and encouraging deep breathing exercises and oxygen administration during the early postoperative period. The respiratory and circulatory rate may be increased valuably by getting these patients up early after operation. Furthermore, a careful check on the water balance will help prevent stasis. The problem of blood protein and hemoglobin levels has already been discussed.

For the most part the factors which make a poor risk patient in young and middle-aged groups work in the aged group also and if surgical management is modified according to their special requirements, fewer old-age patients need be denied the extended life and increase comfort which surgery may offer.

#### Chemotherapy

I have purposely avoided a discussion of chemotherapy in the pre-operative and postoperative

<sup>\*</sup>Vitamin B-Complex (Solu-B, Upjohn) 5 c.c., or Betalin Complex (Eli Lilly) 4 to 6 c.c. These amounts contain concentrated doses of the B-Complex.

management of the bad risk patient. At this time, the enormous strides that are being made in sulfonamide and penicillin therapy have such profound implications that premature evaluations might very easily become injudicious in the light of future work. However, there is one reservation which I feel is not too pedantic. The tendency to depend too much on the efficacy of the sulfonamides and penicillin may lead to unwarranted and indiscriminate disregard of many thoroughly-established surgical principles. Such omissions will not be corrected even by the most careful administration of these newer chemotherapies. Let us hope that this unbounded enthusiasm for these chemicals does not produce a decline in surgical principles and techniques. If these biostatic chemicals fulfill even a small part of the prophecies being made by many otherwise conservative men of science, a surgical renaissance is in the making; and the problem of pre-operative and postoperative management of the bad risk patient should shrink in magni-

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#### MALIGNANT GROWTHS OF THE MASTOID PROCESS AND MIDDLE EAR

FREDERICK A. FIGI, M.D., and BERT E. HEMPSTEAD, M.D. Rochester, Minnesota

NVOLVEMENT of the middle ear and the mastoid process by a malignant neoplastic process has generally been considered almost a pathologic curiosity. Moreover, the condition has been quite universally supposed to respond unfavorably to therapeutic measures. Actually, this lesion occurs less rarely than the medical literature would lead one to believe and, if the condition is recognized reasonably early and is dealt with adequately, the prognosis is as satisfactory as that generally offered by malignant tumors of the nasal accessory sinuses.

#### Literature

The literature on malignant tumors of the middle ear and the mastoid process is not extensive. The largest series of cases reported (13) is that of Thorell, presented with a consideration of the treatment of this condition at the Radiumhemmet. Outstanding articles on this subject in the American literature have been written by Furstenberg, Schall and Spencer. In addition, reports of cases have been presented by Robinson, Bowman, Smith, Newhart, Stokes and others.

#### Incidence

During the twenty-year period ending Decem-

ber 31, 1941, there were seen at the Mayo Clinic forty-eight patients who had malignant tumors involving the middle ear and the mastoid process. More than 500 additional patients observed during this period had malignant lesions involving only the pinna or the external auditory canal.

#### Site of Origin

The middle ear and the mastoid process may be involved by a malignant neoplasm arising primarily in these situations or they may be invaded secondarily by a lesion that has originated in the pinna or in the structures adjacent to it. For convenience we have designated the former as intrinsic growths. Tumors having their origin in the pinna, in the skin of the surrounding region, in the parotid gland, in the nasopharynx or in other structures outside of the ear are referred to as extrinsic. In our experience the intrinsic growths outnumber the extrinsic, and this predominance holds generally in cases of this type reported by other observers. In twenty-five of the thirty-eight cases observed at the Mayo Clinic, the tumors were considered intrinsic. In the remaining thirteen cases, the lesions were extrinsic.

#### Symptoms

The clinical course of malignant disease of the middle ear and the mastoid process varies greatly. Symptoms may be present for only a few weeks or months or they may exist for some years.

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Read before the meeting of the Minnesota Academy of Ophthalmology and Otolaryngology, held as part of the meeting of the Minnesota State Medical Association, Rochester, Minnesota, April 13, 1944.

From the Section on Laryngology, Oral and Plastic Surgery (Figi) and the Section in Otolaryngology and Rhinology (Hempstead), Mayo Clinic, Rochester, Minnesota.

The symptoms most commonly complained of are pain, discharge from the ear, the presence of an ulcer in or about the ear and decreased hearing on the affected side. Bleeding from the ear, facial paralysis, vertigo, mastoid tenderness, tinnitus and the presence of a tumor are encountered less frequently. The complaint most commonly made by patients in this series of cases was of pain in the ear. A few patients, however, experienced no pain whatever. Pain, when present, was usually of a steady aching character but occasionally became lancinating and in some cases was more of a sense of pressure or throbbing than intense distress.

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Next to pain in or about the ear, the most common symptom was a discharge from the ear. At times it had had its inception in an acute of tiss media in childhood and thus had preceded other symptoms by years. Often there was nothing unusual about the character or the amount of the discharge but at times its very foul odor, watery consistency and the fact that it was blood tinged had been noted by the patient. A fifth of the patients had experienced spontaneous bleeding from the auditory canal.

In the thirteen cases of extrinsic tumor, the presence of an ulcer or a tumor in the external canal or about the pinna or the mastoid region was the most frequent complaint.

Otorrhea of long duration is generally considered an important etiologic factor in the development of such neoplasms, but whether it has any direct bearing in this regard is debatable.

In this series of thirty-eight cases, there had been long-continued aural discharge in only eleven.

#### Clinical Findings

The clinical picture in cases of malignant tumors of the middle ear and the mastoid varies greatly depending on whether the neoplasm has originated within these structures or has originated externally and invaded them secondarily. Tumors developing intrinsically may reveal little evidence of their presence until well advanced; in most instances, the subjective symptoms are out of all proportion to the physical findings. In an unusual case of this type, in which the patient was a woman, forty-three years of age, the only objective sign demonstrable was the presence of tenderness in the tissues over the mastoid region, yet exploration revealed an extensive, highly

malignant, squamous cell epithelioma of the mastoid process and considerable destruction of bone. More commonly, the external auditory canal is filled with polyps which frequently recur and may be fairly fibrous. A highly vascular, readily bleeding mass or a granular growth may be present in the canal, or the canal may be greatly narrowed by diffuse thickening or infiltration of its walls.

In cases of extrinsic malignant lesions with invasion of the tympanum and the mastoid process, the clinical findings are likely to be pronounced. Unless treatment has been carried out recently, in a high percentage of cases the nature of the lesion will be obvious to a physician who has had appreciable experience with malignant neoplasms. clinical diagnosis of epithelioma was made in a large proportion of the cases of extrinsic lesions in this series and subsequent microscopic studies corroborated this diagnosis. Malignant ulceration of varying extent was present in most of the cases of epithelioma, and in a number of cases there was fixation of the ulcer over the mastoid region. Direct extension of the neoplasm inward along the external auditory canal was encountered usually although at times the ulceration overlying the mastoid process was penetrating into the bony structures beneath.

#### Treatment

In the past the treatment of malignant tumors of the middle ear and the mastoid process has been discouraging. Such cases are encountered so seldom that it has been difficult to develop an effective method of therapy based on accumulated experience. Treatment has consisted chiefly of surgical removal of the tumor and irradiation, either alone or combined, and in only exceptional cases has this resulted in more than temporary palliation.

Originality is not claimed for the method of treatment that we have employed in cases of this type. The procedure has evolved rather largely from that used in dealing with malignant neoplasms of the nasal accessory sinuses and larynx and likewise has improved considerably since the development of electrosurgical methods. In the cases which were observed early in our experience, treatment consisted almost exclusively of radium packs and direct application of radium tubes with or without excision. This method of treatment has been supplanted by the more ra-

#### MALIGNANT GROWTHS OF THE MIDDLE EAR-FIGI AND HEMPSTEAD

TABLE I. SUMMARY OF RESULTS IN THIRTY-EIGHT CASES OF MALIGNANT TUMORS OF THE MIDDLE EAR AND THE MASTOID,

| Date of<br>regis-<br>tration | Age,<br>years,<br>and sex | Site of<br>origin<br>of tumor | Pathologic Condition  | Treatment   | Freedom<br>from<br>recurrence,<br>years | Results   |
|------------------------------|---------------------------|-------------------------------|---|---|---|---|
| Oct.,<br>1919                | 54<br>M                   | Extrinsic                     | Basal cell and squamous<br>cell epithelioma, grade 1                | Repeated cautery excision and irradiation                                     | Periods, 31/2 to 51/2                   | Died of recurrence 15<br>years after original<br>treatment at clinic                |
| April,<br>1921               | 28<br>F                   | Intrinsic                     | Pibrosarcoma, grade 4   | Mastoidectomy and irra-<br>diation; plastic correction<br>of facial paralysis | 8                                       | Living and well more<br>than 8 years  |
| Sept.,<br>1922               | 71<br>M                   | Extrinsic                     | Basal cell epithelioma  | Irradiation   |   | Palliation; died of epi-<br>thelioma May, 1924                                      |
| an.,<br>1923                 | 57<br>M                   | Extrinsic                     | Squamous cell epitheli-<br>oma, grade 3                             | Irradiation   |   | Palliation; died of re-<br>currence, May, 1927                                      |
| March,<br>1924               | 51<br>M                   | Intrinsic                     | Squamous cell epitheli-<br>oma, grade 2                             | Irradiation   | 3                                       | Receiving colloid gold<br>at home 3½ years later                                    |
| Oct.,<br>1924                | 43<br>P                   | Intrinsic                     | Squamous cell epitheli-<br>oma                                      | Exploration, mastoidectomy and irradiation                                    |   | No benefit; died of ab-<br>scess of temporal lobe<br>3 months later                 |
| an.,<br>925                  | 55<br>M                   | Extrinsic                     | Basal cell epithelioma  | Radical mastoidectomy and removal   | 1                                       | Probable recurrence 14 months later   |
| March,<br>926                | 51<br>F                   | Intrinsic                     | Squamous cell epitheli-<br>oma, grade 2                             | Exploration and irradiation   |   | Probably palliation on-<br>ly; died; date unknown                                   |
| April,<br>1928               | 50<br>M                   | Extrinsic                     | Adenocarcinoma, mixed tumor   | Excision, May, 1928, and<br>April, 1936, and irradiation                      | 8                                       | Returned with recur-<br>rence after 8 years;<br>died of recurrence 3<br>years later |
| Sept.,<br>1928               | 70<br>M                   | Extrinsic                     | Adenocarcinoma, grade 3;<br>squamous cell epitheli-<br>oma, grade 3 | Cautery excision, diathermy and irradiation                                   | 2                                       | Well 2 years after treat-<br>ment   |
| an.,<br>929                  | 55<br>M                   | Intrinsic                     | Pibrosarcoma, grade 3   | Biopsy and irradiation  |   | Palliation; probably dead   |
| Aug.,<br>929                 | 65<br>M                   | Extrinsic                     | Squamous cell epitheli-<br>oma, grade 3                             | Cautery excision and dia-<br>thermy   |   | Died of meningitis 1<br>month after operation                                       |
| Dec.,<br>929                 | 68<br>M                   | Extrinsic                     | Basal cell epithelioma  | Diathermy and irradiation   | 2                                       | Well 2 years after treat-<br>ment   |
| une,<br>930                  | 54<br>M                   | Extrinsic                     | Adenocarcinoma, mixed tumor type                                    | Excision and irradiation  | 81/2                                    | Died 101/2 years after<br>treatment; cause un-<br>known                             |
| Oct.,<br>930                 | 42<br>M                   | Intrinsic                     | Squamous cell epitheli-<br>oma, grade 1                             | Exploration and irradiation   | Unknown                                 | Patient could not be traced   |
| une,<br>931                  | 50<br>F                   | Extrinsic                     | Adenocarcinoma and<br>squamous cell epitheli-<br>oma, grade 3       | Diathermy, radical mas-<br>toidectomy and irradiation                         | 101/2                                   | Well 101 years  |
| une,<br>931                  | 45<br>F                   | Intrinsic                     | Hemangio-endothelioma,<br>grade 2                                   | Radical mastoidectomy and irradiation   | 10                                      | Well 10 years   |
| Mar.,<br>932                 | 63<br>M                   | Extrinsic                     | Basal cell epithelioma  | Diathermy, radical mas-<br>toidectomy and irradiation                         | 91/2                                    | Well 9½ years   |

Most of this table appeared in the article by these same authors, entitled: "Malignant tumors of the middle ear and the mastoid process" which appeared in the Archives of Otolaryngology, 37:149-168, (Feb.) 1943, and in the Transactions of the American Academy of Optolaryngology and Otolaryngology for Jan.-Feb., 1943. In any cases in which more recent information concerning results was available, however, it has been supplied here.

tional and effective procedure of exposing the tumor surgically, removing it with electrocoagulation under direct observation, and implanting radium points directly into the wound and applying radium packs or roentgen therapy externally.

Surgical Procedure.—The wide removal of the accessible portion of the neoplasm by means of electrocoagulation, either with the coagulating current, the cutting current, or both, seems definitely to be an improvement over excision. Often the tumor is fixed to the mastoid process and

must be stripped directly from the bone. Frequently, it is impossible to avoid injuring the facial nerve, if it has not already been destroyed. If there is any question regarding the possibility of invasion of the bone, the involved portion should be removed and the mastoid cells opened. Perforation of the pinna may be present, in which event it is necessary to remove enough of the full-thickness of this structure to include a wide margin of the normal tissue. When, as is commonly true, the growth fills the external auditory canal or extends deeply along its walls, electro-

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#### MALIGNANT GROWTHS OF THE MIDDLE EAR-FIGI AND HEMPSTEAD

TABLE I (Continued)

| Date of<br>regis-<br>tration | Age,<br>years,<br>and sex | Site of<br>origin<br>of tumor | Pathologic Condition                                 | Treatment  | Freedom<br>from<br>recurrence,<br>years | Results  |
|------------------------------|---------------------------|-------------------------------|--|--|---|--|
| Sept.,<br>1932               | 54<br>F                   | Extrinsic                     | Basal cell and squamous<br>cell epithelioma, grade 2 | Diathermy  |   | Sequestrum removed at<br>home 4 months later;<br>not traced thereafter |
| Oct.,<br>1932                | 52<br>F                   | Extrinsic                     | Basal cell and squamous<br>cell epithelioma, grade 1 | Repeated removal with cau-<br>tery, diathermy and irra-<br>diation; dissection of lymph<br>nodes | 1+                                      | Died of recurrence after<br>8 years                                    |
| Aug.,<br>1933                | 47<br>F                   | Intrinsic                     | Squamous cell epitheli-<br>oma, grade 4              | Radical mastoidectomy and irradiation  |   | Palliation; died of re-<br>currence after 8<br>months                  |
| Feb.,<br>1934                | 59<br>M                   | Extrinsic                     | Basal cell and squamous<br>cell epithelioma, grade 1 | Diathermy and irradiation  | 7                                       | Well 7 years   |
| June,<br>1934                | 50<br>F                   | Extrinsic                     | Basal cell epithelioma                               | Diathermy, radical mas-<br>toidectomy  | . 7                                     | Well 7 years   |
| Aug.,<br>1936                | 43<br>F                   | Intrinsic                     | Squamous cell epitheli-<br>oma, grade 3              | Exploration of mastoid and irradiation   |   | Palliation; died of re-<br>currence after 16<br>months                 |
| Nov.,<br>1936                | 65<br>M                   | Extrinsic                     | Squamous cell epitheli-<br>oma, grade 2              | Cautery excision, diathermy and irradiation  |   | Died of meningitis and<br>septicemia on fifteenth<br>day               |
| Jan.,<br>1937                | 44<br>M                   | Extrinsic                     | Squamous cell epitheli-<br>oma, grade 1              | Radical mastoidectomy and irradiation  |   | Palliation; died 4 years<br>later, probably of re-<br>currence         |
| Peb.,<br>1937                | 42<br>F                   | Intrinsic                     | Hemangio-endothelioma,<br>grade 1                    | Exploration, mastoidectomy and irradiation   | 31/2                                    | Well 31/2 years later  |
| Oct.,<br>1937                | 66<br>F                   | Intrinsic                     | Squamous cell epitheli-<br>oma, grade 2              | Biopsy and irradiation   | 31/2                                    | Well 3½ years  |
| April,<br>1938               | 59<br>F                   | Extrinsic                     | Basal cell and squamous<br>cell epithelioma, grade 1 | Diathermy, radical mas-<br>toidectomy and irradiation  | 3¾                                      | Well 3% years  |
| April,<br>1938               | 57<br>F                   | Intrinsic                     | Squamous cell epitheli-<br>oma, grade 3              | Radical mastoidectomy dia-<br>thermy and irradiation;<br>gland dissection                        | 36                                      | Treated elsewhere for recurrence 8 months later                        |
| June,<br>1938                | 48<br>F                   | Extrinsic                     | Adenocarcinoma<br>(cylindroma)                       | Diathermy, radical mas-<br>toidectomy and irradiation  | 21/2                                    | Well 21/2 years  |
| Dec.,<br>1938                | 46<br>F                   | Intrinsic                     | Hemangio-endothelioma,<br>grade 1                    | Removal and irradiation  |   | No recurrence after 4 years  |
| Oct.,<br>1939                | 42<br>F                   | Intrinsic                     | Hemangio-endothelioma,<br>grade 1                    | Radical mastoidectomy and<br>irradiation   | 2                                       | Well 23/4 years  |
| Oct.,<br>1939                | 80<br>P                   | Intrinsic                     | Squamous cell epitheli-<br>oma, grade 2              | Biopsy and irradiation   |   | Probably palliation on-<br>ly; patient could not<br>be traced          |
| Nov.,<br>1939                | 27<br>M                   | Intrinsic                     | Hemangio-endothelioma,<br>grade 1                    | Exploration, mastoidectomy and irradiation   | 11%                                     | No recurrence when pa-<br>tient was observed last<br>1½ years later    |
| Aug.,<br>1941                | 37<br>M                   | Intrinsic                     | Hemangio-endothelioma, grade 1                       | Exploration, mastoidectomy and irradiation   |   | Returned with recur-<br>rence after 27 months                          |
| Sept.,<br>1941               | 33<br>F                   | Intrinsic                     | Hemangio-endothelioma,<br>grade 1                    | Radical mastoidectomy and irradiation  |   | No recurrence after 2% years   |
| Dec.,                        | 3<br>F                    | Intrinsic                     | Neurofibrosarcoma                                    | Radical mastoidectomy,<br>diathermy and irradiation  |   | Died 3 months after op-<br>eration                                     |

coagulation is carried as far as it is possible to visualize the tumor. The mastoid process then is opened and, unless a neoplasm is encountered, the procedure at once is completed as a radical mastoidectomy and the posterior wall of the canal is removed. If tumorous tissue is encountered on removal of the bony cortex, as is often the case, this tissue is destroyed with the diathermy electrode, the dissection of bone being continued as necessary to expose more of the neoplasm. In this way, electrocoagulation and dissection of bone

are alternated until the tumor has been removed completely. During this process a varying portion of the dura may be exposed. In fact, the facial nerve, a wide area of dura and a considerable part of the lateral sinus, the jugular bulb and other intracranial structures may be uncovered. As the bony posterior wall of the external auditory canal is removed, if this wall has not already been destroyed by the pathologic process, the portion of the tumor that could not be reached through the meatus is rendered accessible.

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Provided the dura is intact, surprisingly little postoperative reaction usually follows the surgical procedure even though the neoplasm has been extensive and has necessitated intensive electrocoagulation. There is no doubt that in questionable cases the risk of meningitis and of other intracranial complications is increased greatly by attempts to deal with such conditions conservatively and by failure to open the mastoid process and to expose the dura. After surgical intervention the patient as a rule experiences great relief from pain and, if the operation has been complete, cessation of the otorrhea is phenomenal. However, if the neoplasm is infiltrating the dura, any relief from symptoms produced by removal of the bulk of the tumor is likely to be only transitory, and prompt recurrence is almost sure to occur even though intensive irradiation is used to supplement the operation.

It has been our practice routinely after surgical removal of a malignant neoplasm of the middle ear and mastoid process to place radium points or tubes directly in the operative cavity and to employ a fairly caustic dose. A few days after operation, this treatment is supplemented with radium packs or roentgen therapy. When the mastoid process is opened, if the tumor is found to be highly malignant and the involvement so extensive that complete surgical removal appears impracticable, no attempt at surgical exenteration is made. Instead, radium points or tubes are immediately implanted directly into the growth and the wound either is sutured loosely or a gauze pack is inserted to hold the radium in place. Also, in some cases of extensive, highly vascular neoplasms, the bleeding is uncontrollable and it is necessary to terminate the operation, insert radium and pack the wound.

Considerable necrosis of bone usually results from the electrocoagulation and irradiation. In the mastoid process the resultant sequestrum separates slowly, often requiring a year or longer. Because it often is impossible to determine the extent of the necrotic process, it is inadvisable to attempt to remove sequestra before they have loosened, for excessive trauma is likely to result from such efforts and there is a possibility of meningitis. On the other hand, if removal is delayed until separation is complete, the process will be found well walled off, there is no appreciable trauma and epithelization of the wound takes

place promptly, even though a wide area of dura may be uncovered. Should evidence of recurrence of the neoplasm appear at any time after the operation, however, removal of the sequestrum and biopsy may become necessary even though the dead bone still is fixed firmly. than

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#### Prognosis

In cases of malignant tumors of the middle ear and the mastoid process, the malignant process extends by direct contiguity; metastasis rarely occurs and dissection of the lymph nodes is not indicated unless they are involved. Extension into the cervical lymph nodes took place in only two of the cases in the series under consideration.

The result likely to be obtained in any given case of malignant tumor of the middle ear and the mastoid process is difficult to anticipate because of the great variation in the factors involved. The nature of the neoplasm and its activity and extent are extremely important and it frequently is impossible to determine these until the mastoid process and the tympanum have been explored. In many cases, the tumor will be found so extensive and highly malignant that palliation only can be expected. On the other hand, a growth that has appeared clinically to be bordering on inoperability may be found on exploration to be readily removable. This has been noted especially in cases of adenocarcinoma of mixed tumor type. In our experience, one of the most frequently encountered intrinsic growths is a hemangio-endothelioma (angiosarcoma) which, although it usually is of a low grade of malignancy, is so highly vascular that clean surgical removal often is impossible. In fact, in many cases electrocoagulation will not control the bleeding and coagulation cannot progress because of it.

#### Results

A summary of the results obtained in the thirtyeight cases in this series in which treatment was given is presented in Table I. It will be noted that twenty patients lived two years or more after treatment, fifteen lived three years or more, ten lived seven years or more, eight lived eight years or more, three lived more than ten years and one lived fifteen years.

#### Summary and Conclusions

Malignant tumors involving the middle ear and the mastoid process occur more frequently

than the medical literature would lead one to believe, and the prognosis is more satisfactory than generally is thought. The symptoms and clinical features of intrinsic malignant disease at times are the same as in cases of inflammatory disease of the middle ear and the mastoid process, and

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exploration and biopsy may be necessary for diagnosis. The most effective form of treatment for neoplasms of this type is a combination of electrocoagulation, radical mastoidectomy and irradiation, and in indicated cases this treatment often is of considerable benefit.

#### VIRUS PNEUMONIA

#### A Résumé and a Therapeutic Suggestion

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S INCE the first description of what we are accustomed to call "virus pneumonia," it has been found that there are many types of this disease, which from time to time come to the attention of the practicing physician. The use of bacteriological methods, and also the use of sulfonamide drugs have thrown this condition into a separate category and have established it rather as a group of diseases because of failure of response to the sulfonamide drugs, and because of failure to isolate any single etiologic agent in its study. We may consequently classify all virus pneumonias into two forms: (1) nonbacterial pneumonias of known virus or rickettsial origin; and (2) atypical pneumonias of unknown etiology.

The most common virus pneumonia of known etiology is influenzal pneumonia, due to the filtrable virus which is known as the virus of Smith, Andrewes and Laidlaw. This virus was isolated in 1936, is known as Virus "A," and is frequently found to have an associated staphylococcus infection, or it may be associated with a hemolytic streptococcus as a secondary infector. Recently an influenzal virus known as Virus "B" has also been found. A second condition of known virus etiology is psittacosis, which has been found to be due to minute cocco-bacillary bodies known as the Levinthal, Coles, Lillie bodies. According to some observers, these may not be considered as true virus bodies, and they are being intensively studied at the present time because the pathology which they produce does resemble that produced in our present form of virus pneumonia. Etiologically, of course, psittacosis is known to result from exposure to infected parrots. It has a higher

mortality than the condition under study, and the so-called virus has been isolated by the injection of sputum into mice. It is also being studied at the present time because of the antigenic relationship of this virus to that of lymphogranuloma venereum, trachoma, and inclusion blennorrhea. However, the interesting fact remains that these last three conditions are chemo-therapeutically susceptible, whereas the other conditions are not. A third condition of virus etiology is ornithosis, a disease recently classified and named by Meyer, which is due to a "psittacosis-like" virus found frequently in aviaries and found also in pigeons and barnyard fowl. It is interesting to note that a great many pneumonias in the New York area have been known to be due to the virus of ornithosis, so that this one form of atypical pneumonia will probably be called ornithotic pneumonia.

A large group of virus diseases which have pneumonic manifestations are those due to rickettsia, the most common of which are typhus and Rocky Mountain spotted fever. Rickettsia are small gram negative rod-shaped bodies, 1 to 1.5 micra in diameter, often coccoid in shape and may be found in the feces of the flea and louse which are common transmitters of the disease known as typhus, and in that of the tick, which commonly is a transmitter of Rocky Mountain spotted fever. The rickettsias responsible for these diseases have been named and isolated, and the fact that pneumonias of virus origin do develop in these conditions has been well established.

Lastly, any consideration of virus pneumonia would be incomplete without mentioning "Q" fever. This disease was first described in Australia and is thought to be rickettsial in origin. The rickettsia is very like that which is isolated in

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typhus and Rocky Mountain spotted fever but it fails to agglutinate the Bacillus proteus X19 or XK, a reaction which is known as the Weil-Felix reaction, and there is no cross immunity present. The rickettsial body found in Australian "Q" fever is known as R. burneti, whereas that found in typhus and Rocky Mountain is known as R. prowazi. Recently an American counterpart of Australian "Q" fever has been found, and it is now known as American "Q" fever. The rickettsia which is known as R. diaporici is very like that found in Australia and the current disease has been described in epidemic form at the National Institute of Health in Washington, D. C. The difference between Australian and American "Q" fever is that there has been no definite pulmonary involvement in the Australian cases. By way of historical interest, it may be mentioned that Australian "Q" fever derived its name originally from the fact that the first cases were described in Queensland, Australia, from whence the letter "Q" was used to designate the name of the disease.

With the foregoing summary of virus diseases well in mind, it is now possible to consider the type of so-called virus pneumonia which has been confronting the physicians throughout most of the United States during the past several years. This pneumonia has been perhaps best designated by the Surgeon General as "primary atypical pneumonia, etiology unknown." It is also known as bronchopneumonia-Type X, acute diffuse bronchiolitis, acute pneumonitis, and acute interstitial pneumonia. Fundamentally, the disease is really a syndrome, probably with multiple etiologic factors responsible for its establishment, and as time goes on our knowledge of the disease will no doubt be enhanced by more definite knowledge of the true etiologic agent or agents. The disease occurs in epidemic form at times. It appears to affect both sexes equally, and has a particular predilection for young adults. It has no regard for season and is probably spread by contact. The incubation period of the disease has been variously estimated at from seven to twenty-one days, although some workers have claimed that they have definite knowledge of the disease going through an incubation period of only one to two days. Clinically this form of pneumonia is characterized by its insidious onset (usually), and the predominating symptoms are fever, malaise, headache, chilliness,

and cough. To elaborate further on these symptoms, one might state that the fever may range up to 105 degrees, and that it may follow what is known as a steeplechase type of temperature curve. The fever may last up to three weeks or slightly more. The headaches are usually severe, especially early in the disease. Chilliness is the rule rather than real shaking chills, which are characteristic of true lobar pneumonia. The chilliness, however, is a very annoying symptom and, in many patients, it alternates with drenching sweats which are so severe as to necessitate frequent changes of clothing, and as to certainly render hospitalization advisable. The malaise is out of proportion to the type of fever and to the illness of the patient.

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The physical findings are of interest. The first striking fact is the observation that the patient is usually not as sick in appearance or in action as the chart would seem to indicate, and this fact alone is very reassuring in many instances. Frequently, the mild cases are ambulant, but the serious ones may be so ill as to demonstrate cyanosis and dyspnea. On physical examination of the chest at first there may be no findings whatsoever. Very rarely is there a change to percussion. Within a few days rales may appear and frequently this may be preceded by roughening in the breath sounds. The râles may persist long after normal temperature has obtained. The râles are usually sticky in character and wheezing and musical in nature, and only rarely is bronchial breathing heard, and in these instances usually only over a small area. The pulse is usually slow in proportion to the temperature, and rarely is there any dilatation of the alae nasae. Abdominal distention is rare, herpes is rare, and occasionally a palpable spleen may be found.

The laboratory findings in virus pneumonia are not markedly significant. The white blood count is usually normal, or it may be decreased, and only very rarely is an elevated count seen. The urine examination usually reveals nothing of importance. As might be expected, the x-ray of the chest is of utmost significance in rendering a satisfactory diagnosis. The x-ray findings may demonstrate a large area of consolidation but frequently only a small area in the hilus region itself may be encountered. The area may be round or may be fan-shaped. As the disease progresses

this area may extend to the periphery of the lung. It is rare to find fluid present in the pleural cavity during the course of the disease. Lateral views will often help to localize areas of consolidation to the hilus region. Occasionally multiple areas of consolidation are seen and rarely there may be subsequent areas appearing at varying time intervals either in the same or opposite lung. The clinical course of the disease is usually slow. The white blood count may elevate as the disease progresses. The fever subsides by lysis usually in any period of time up to three weeks, and occasionally it may persist even longer. During this period, chills and steeplechase type of fever may predominate for the entire time.

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There are very few complications of this disease. Laryngitis and tonsillitis are a common accompaniment, sinusitis is probably less common, and only occasionally has otitis been described. There have also been a few instances of pneumonia due to a contaminating organism such as streptococcus or staphylococcus, following a true Fortunately there have been virus pneumonia. few opportunities for postmortem pathologic studies. In the instances where such studies have been feasible, patchy hemorrhagic areas of socalled interstitial bronchial pneumonia have been No definite etiologic agents have been isolated in most of the virus pneumonia seen in the Middle West, and it has been difficult to state in just what category of virus pneumonia most of these cases fall. Many studies have been done, including passage through the ferret, with-There have been questionable results in the mongoose as published by Weir and Horsfall. The diagnosis will be uncertain until further work is done with this method of study, but there is no doubt in the minds of most investigators that the diagnosis of virus pneumonia should be a laboratory procedure in order to separate out those other virus diseases which may produce a similar clinical picture.

Treatment of virus pneumonia has not afforded the clinician much opportunity for a display of skill. For the most part it may be briefly summarized as supportive therapy with the relief of cough a predominant feature. The sulfonamide drugs are certainly not of value but may be used empirically until an accurate diagnosis is made. Following the accurate diagnosis of virus pneumonia the sulfonamide drugs may be either dis-

continued or continued in markedly reduced amounts because of their bacteriostatic value for the prevention of complications. The use of transfusions has been suggested and was first carried out by Knieland and Smetana in 1940.' The results, however, were not considered of extreme Flexner and Garon attempted the transfusion of plasma without too successful results. In a series of cases seen by the author, it was decided that it might be of value to use the injection of convalescent serum in an attempt to control the disease or shorten its term. A brief résumé of a few of these cases will be given at this time. The first case is that of an intern at the Miller Hospital who subsequently became the donor of the first immune serum used.

Case 1.—F. M., a white man, aged twenty-four, was admitted to the hospital on October 21, 1942, with a spiking temperature as high as 103.8. This persisted for sixteen days with patchy involvement of both lungs. The lesions would appear in various portions of the lung and run through their course, and the patient was quite ill at all times until resolution finally took place. He was dismissed on November 15, 1942. About two weeks later his younger brother, who is the subject of Case 2, became ill.

Case 2.-L. M., a boy aged thirteen, was admitted to the Miller Hospital on December 1, 1942, with a temperature of 104 degrees, and a history of illness beginning on November 29, 1942, or exactly two weeks after his older brother was dismissed from the hospital. On admission he was found to have pneumonia of the left lower lobe, his temperature reached as high as 104.6, and daily rose above 104 degrees. On December 6, or six days after admission, he was given a first injection of 25 c.c. of convalescent serum, and this was repeated on December 7, following which his temperature was 100 degrees. On December 9 his temperature was 99 degrees and it remained normal thereafter. In this case there was a very marked symptomatic and general improvement following immediately after the giving of the convalescent serum.

Case 3.—Mrs. V. S., aged thirty-nine, was admitted to the hospital on December 10, 1942, with pneumonia of the right lower lobe. She had a spiking temperature up to 101 degrees. This continued for six days and on December 16 and December 17 she was given immune serum which was followed by prompt regression to normal temperature so that she was dismissed from the hospital on December 20, or three days after the second administration of convalescent serum.

Case 4.—Mrs. R. G., aged forty, was admitted to the Miller Hospital, September 19, 1943, and discharged on October 19, 1943, with a diagnosis of pneumonia of the right lower lobe and right hilus, and left upper

lung field. The x-ray picture was characteristic of atypical primary pneumonia. Her temperature rose to 104.4 and after the eighth day was still ranging above 102 degrees where it remained until the fifteenth day, when her first injection of 25 c.c. of convalescent serum was given. This was repeated on the sixteenth day of her illness. Her temperature reached only 99.6 degrees on the seventeenth day and was normal thereafter. It is interesting to note that in this case an x-ray examination of the chest made on the thirteenth day of her illness, which was two days prior to the first serum, showed a further extension of the pneumonia on the right with only slight resolution beginning on the left. This case again represents prompt response to the use of convalescent serum.

#### Conclusions

Primary atypical pneumonia of unknown etiology is a disease with which all physicians have had to reckon in the past several years. The present résumé is justified because of the apparent increasing incidence of the disease, and because of the scope of the subject which is truly a global one, and one which will probably require even greater familiarity in the future. Finally, this report is justified because of the suggested value of convalescent serum in the treatment of primary atypical pneumonia, the results of which have been outlined in this paper so as to form the basis of a preliminary report and to encourage the further use of this method of treatment so that an increased experience in its application may soon be developed.

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#### VARICOSE ULCERS

#### A Study of 143 Cases

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UR purpose in this paper is to describe the treatment employed in the Mayo Clinic for varicose ulcers, to summarize the commonly associated condition, and to evaluate the effect on healing of such factors as age and sex.

During 1943, January to December, inclusive, there were encountered at the clinic 153 cases of ulcer of stasis type, that is, ulcers attributable to varicose veins alone or varicose veins with associated obstructive thrombophlebitis. Of these 153 cases, nine were eliminated from consideration because the patients either left the clinic before dismissal or before healing was complete. One other case was excluded because, though varicose veins and evidence of stasis were present, the ulcer primarily was attributable to extravascular spillage of sclerosing agent used in treatment elsewhere. On exclusion of these ten cases, there remained 143 cases, which formed the basis for this study. Of the 143 cases, the ulcers were unilateral in 133 cases (93 per cent) and bilateral in ten cases (7 per cent).

The duration of the ulcers treated in this series varied from the relatively short period of one week to fifty years, the average duration being 3.6 years. In many cases, one or more ulcers had been present intermittently for many years, but the preceding statement concerning duration applies only to the ulcer presented for treatment and not to the time since inception of the trouble.

The ulcers varied greatly in size from small multiple ulcers to large solitary ones. The diameter of the smallest was 0.5 cm., and that of the largest averaged 10 cm. The average diameter of all ulcers was 2.41 cm. All ulcers were located in the lower 5 inches (13 cm.) of the leg in the posteromalleolar and inframalleolar regions and superior to the malleolus, the majority being just above the inner malleolus.

Stasis dermatitis, pigmentation, edema, brawny

From the Mayo Foundation (Fellow in Surgery, Holmes) and the Section on Postoperative Care, Mayo Clinic (Smith), Rochester, Minnesota.

TABLE I. CONDITIONS ASSOCIATED WITH VARICOSE ULCERS IN 143 CASES.

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| Condition                          | Cases | Per Cent of 143 Cases |
|------------------------------------|-------|-----------------------|
| Stasis dermatitis                  | 81    | 56.6                  |
| Pigmentation                       | 37    | 25.8                  |
| Cellulitis                         | 33    | 23.0                  |
| Edema                              | 30    | 20.9                  |
| Brawny infiltration                | 29    | 20.2                  |
| Thrombophlebitis                   | 8     | 5.6                   |
| One condition co-existing          | 50    | 35.0                  |
| Two or more conditions co-existing | 93    | 65.0                  |

infiltration, thrombophlebitis and cellulitis, the conditions most commonly associated with varicose ulcers, are not a result of the ulcers. With the exception of thromophlebitis, these conditions are sequelae of the primary pathologic condition, that is, stasis with improper oxygenation. Thrombophlebitis, when present, is not a sequela but a primary process in itself. Stasis dermatitis, as would be expected, was the most common associaated condition, being present in eighty-one of the 143 cases (56.6 per cent). Pigmentation was present in thirty-seven cases (25.8 per cent), edema in thirty cases (20.9 per cent) and brawny infiltration in twenty-nine cases (20.2 per cent). There was a history, or irrefutable evidence, of thrombophlebitis in eight cases (5.6 per cent). In all cases of open ulcer, of which there were thirty-three (23 per cent), there was some local infection, necrotic slough or definite cellulitis as evidenced by a red, inflamed, indurated and sometimes elevated, margin. In fifty of the 143 cases (35 per cent) only one of these conditions was present; in the remaining ninety-three cases (65 per cent) two or more conditions were present. A summary of the conditions associated with varicose ulcers appears in Table I.

In 123 cases (86 per cent) treatment in the form of ligation and injection was directed toward elimination of the cause of the stasis. The greater saphenous vein was incompetent in 105 of the 123 cases (85.4 per cent). The lesser saphenous vein was incompetent in eleven cases (8.9 per cent) and both the greater and lesser saphenous veins were incompetent in seven cases (5.7 per cent).

In the remaining twenty cases, ligation was contraindicated. In eight of these cases the presence of old thrombophlebitis with evidence of deep occlusion made direct approach impossible

and treatment was confined largely to local attention to the ulcer. In twelve cases the patients were in poor general health or were of advanced age. Three of the twenty patients received injections only. These patients had incompetent venous systems of some type but their age made more complete or permanent forms of treatment unnecessary or unwise.

Ichthyol ointment (3 per cent ichthyol in zinc oxide base) was used as a soothing dressing in 110 of the 143 cases. In the remaining thirty-three cases, those in which cellulitis was present, 5 per cent sulfathiazole ointment was used as a dressing. Twenty-seven of these thirty-three patients (81.8 per cent) received preliminary treatment in the form of hot wet packs of aluminum subacetate (0.5 per cent), dressings and elevation of the extremity.

During the ambulatory period of treatment all 143 patients were treated locally by pressure to prevent edema. In order to create the best conditions for healing of varicose ulcers with stasis it is necessary to prevent edema of hydrostatic type and, during treatment, to prevent edema of inflammatory type. The latter may follow injections of sodium morrhuate or other sclerosing agent. In this report this particular phase of treatment, that is, control of edema, should be emphasized.

In most cases pressure was applied by use of a fairly thick pad of sterile cut gauze. Occasionally a piece of rubber sponge was placed over the ulcer after application of ichthyol ointment. Then the entire leg from the toes to the knee was wrapped with a 3 or 4 inch (8 or 10 cm.) fabric bandage which is elastic (Ace bandage), firm traction being maintained throughout application, particularly when incorporating the pressure pad. The ulcers were dressed daily.

In a few cases an elastoplast dressing was used, particularly when the patients lived in the immediate vicinity and commuted to the clinic at intervals of seven to ten days. In principle this dressing is the same as the Ace bandage but it is somewhat more stable and requires no attention from the patient between dressings.

After the surface infection is cleaned up and the necrotic slough is replaced by healthy granulation tissue, epithelization proceeds rapidly under the pressure dressing. Skin graft was utilized to speed the healing process in seven cases in which large ulcers existed. In these cases the margins of the ulcers exhibited a peculiar indolence which is seen occasionally in lesions of great chronicity. This apparently is attributable to subcutaneous fibrosis with consequent paucity of blood supply. There were twelve cases in which the ulcers had an average diameter greater than 7 cm. Of these twelve cases, in seven (58.3 per cent) skin graft was required.

In all 143 cases healing of the ulcers occurred. The average time required for healing was eighteen days, the longest time being eighty-two days and the shortest, three days. The average time of healing for the eighty-two women, who comprised 57.3 per cent of the series, was nineteen and a half days. The average time for the sixty-one men, who comprised the remaining 42.7 per cent, was sixteen days.

According to this study, the age of the patient made little difference in the healing of varicose ulcers under treatment, in spite of the fact that such accompaniments of advancing years as decreased vascularity, changes in blood vessels and atrophy of tissues allegedly delay healing. The oldest patient was eighty-two years of age and the youngest was twenty-two. The average age was 50.9 years. Ninety-nine of the patients (69.2 per cent) were more than forty-five years of age and forty-four patients (30.8 per cent) were less than forty-five. The average time of healing in the older group was seventeen and a half days and in the younger group, eighteen and a half days.

#### Summary and Conclusions

One hundred forty-three cases of varicose ulcers were studied as to the relationship of age and sex to incidence and to healing and as to location, size and duration of the ulcers. There were eighty-two women (57.3 per cent) and sixty-one men (42.7 per cent). Healing under treatment apparently was somewhat faster in males than in females but since the difference was only approximately three and a half days this was not conclusive. The age of the patient had

little effect on healing. The majority of the ulcers were situated just above the inner malleolus. The smallest was 0.5 cm. in diameter and the largest 10 cm. The duration of the ulcers varied from one week to fifty years.

In this series the conditions most commonly associated with varicose ulcers, in order of frequency, were stasis dermatitis, pigmentation, cellulitis, edema, brawny infiltration and thrombophlebitis.

The treatment employed, which is discussed in detail, consisted in general of ligation and injection, dressings of ichthyol ointment and the application of pressure. Healing of the ulcers occurred in all cases. The results of this regimen were not compared with other advocated forms of treatment, such as ultra-violet light, subcutaneous infiltration with oxygen and various topical applications, since there were no series thus treated at the clinic on which controlled observations had been made. Although this regimen undoubtedly can be improved, we believe it embodies the most physiologic approach to healing of these ulcers that has to our knowledge been employed.

On the basis of this study, the conclusion was reached that in order to secure healing and prevent recurrence it was essential to remove stasis by ligation and injection. It is well known that once an area has been ulcerated it is extremely susceptible to trauma and to spontaneous breakdown if stasis is still present. Thus, the prognosis is much better in ulcers attributable to varicose veins, in which the source of stasis is usually readily eradicated, than it is in varicose ulcers associated with deep thrombophlebitis, in which the prevention of recurrence is dependent largely on continuous counterpressure.

In the future the number of varicose ulcers undoubtedly will decrease. This trend already has become apparent. This is a result of the fact that it has become well known that there is a treatment of varicose veins and also that chronic ulcers, which are difficult or impossible to heal, are the price of neglect.

#### WILLIAM SITGREAVES COX

By JOHN M. ARMSTRONG, M.D. Saint Paul, Minnesota

S OME five or more years ago the small surgical instrument called a "fleam" came into my possession. It is a mechanical lancet and was in use in the early years of the last century. While the instrument itself may be regarded as an antique and a collector's item, the story of its owner surpasses in interest the instrument itself. Had the owner not had his name engraved upon the instrument, my curiosity would not have been aroused and his history would not have been known. Inquiry and some research have revealed the following story.

William Sitgreaves Cox was born in Philadelphia in the year 1790. His father, James Cox, a man of wealth, had come from Bermuda after the War of Independence and established the first marine insurance company in the United States.

On January 16, 1809, while a student at Princeton, W. S. Cox received a warrant in the Navy and in March of the same year was appointed a midshipman. This appointment was revoked the following May as there was no vacancy and he was given a furlough. There is attached to his naval record a note that he was ordered to proceed to India on an East India merchant vessel in order to acquaint himself with navigation and life at sea. It is believed that he visited China also.

On February 26, 1811, after his return, William Cox was ordered to the brig, Argus, under the command of Captain James Lawrence.

War with Great Britain was declared on June 18, 1812, and he served with Lawrence on the *Argus* and on the *Hornet* until Lawrence was relieved of the command of the latter vessel.

About the middle of May, 1813, Lawrence, accompanied by Cox, arrived in New York on his way to Boston to take command of the frigate *Chesapeake*, which was being refitted in Boston harbor.

Lawrence had been most successful in all his engagements with the British and was the hero of the American people, who regarded him as invincible. He was wined and dined in New York and presented with the keys of the city and a piece of plate. While in New York, Lawrence bought a bugle. As this instrument played a somewhat decisive part in the tragedy which ended the careers of both Lawrence and Cox, it may be well to explain the reason for its purchase.

Naval battles of that day were largely duels between individual ships and usually terminated in the capture of one of the ships by boarding and hand-to-hand fighting. In fact, half the crew of a man-of-war were told off as boarders in anticipation of such an event. The signal for boarding was a roll of drums. Lawrence thought that a bugle could be better heard than drums during the din of battle, hence his purchase.

Lawrence reached Boston on May 18, and found the *Chesapeake* ready for sea. Six days later he assembled his crew and asked if any of these could blow a bugle. But one man could, a Portuguese negro, who demonstrated his ability by blowing a few notes. The bugle was entrusted to him.

On the last day of May the British frigate *Shannon*, under the command of Captain Philip Bowes Vera Broke, appeared off Boston harbor. Lawrence took this as a direct challenge to himself. It must be remembered that six months previously Lawrence had found a British ship in the harbor of Santiago, Brazil, and chal-

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lenged it to come out and fight. The British captain refused. The American newspapers dubbed the British captain a coward. This incident one might say compelled Lawrence to regard the *Shannon's* presence as a direct challenge, as it was indeed. Broke had sent a direct challenge to Lawrence but it did not reach Boston until after the engagement was terminated.

This same evening Lawrence, accompanied by Cox, called on Admiral Bainbridge, commander of the naval station at Boston, and made three requests of him: "That his men be paid the arrears on their pay, that Cox be made a lieutenant and that he might borrow some seamen from the other ships in the harbor."

Bainbridge assented to the first two requests and to the latter replied that "he could if he wanted to," or words to that effect. There was ill feeling between Bainbridge and Lawrence over the division of prize money and considerable jealousy on Bainbridge's part.

At noon the next day (June 1) the Chesapeake put to sea and followed the wake of the Shannon.

The Chesapeake approached the Shannon from the rear and to windward. The Shannon hove to and waited. When only forty yards separated the ships, Lawrence gave the order to "luff her" and then put down the helm. This order was plainly heard aboard the Shannon. Broke perceived Lawrence's intention to bring the two ships yardarm to yardarm. I may say here that this order was a distinct surprise to the crews of both ships, as both expected the Chesapeake would cross the Shannon's wake, a maneuver which would have been the tactical thing to do.

As the order was given, the *Chesapeake* opened with a volley of musketry only, the *Shannon* held her fire and waited, manning her starboard batteries. When the *Chesapeake* had completed her maneuvers and was head on, the *Shannon* opened fire and raked her from stem to stern.

Her first broadside killed and wounded 110 of the 150 men on the spar deck. Lawrence was wounded in the leg, Lieutenant White decapitated and the officer commanding the marines killed. With the succeeding three blasts from the Shannon, Lieutenant Ballard was killed and three men in succession killed at the wheel. The stearing gear was demolished and the halyards and rigging of the jib shot away so that the Chesapeake became unmanageable and fell away. Her stern struck the Shannon amidships. At about this same time the ammunition box on the Chesapeake's spar deck caught fire and enveloped the ship in smoke which added to the confusion.

Lawrence gave the order for boarding, but the bugler could not be found as he had hidden under one of the boats and when pulled out was so frightened he could not blow a note. The order, thus delayed, had to be passed by word of mouth.

Lieutenants Budd and Cox were on the gun deck. Cox received the order from Budd. He ordered out his boarders and drove them before him to the spar deck. Cox was not attacked as a boarder but his guns were not bearing on the *Shannon* because of the position of the ships.

As Cox turned to go back to his station he observed Lawrence fall, as a result of a second wound in the groin. With the help of a sailor, he carried Lawrence to the foot of the stairs below the gun deck. Here he left him to be carried to the surgeon and regained his station. He then observed the Chesapeake's crew tumbling pell-mell down the forward hatch. In the meantime he had found one of his guns bearing on the Shannon and discharged it; this was the last gun fired from the Chesapeake.

Midshipman Higgenbotham, who was at the foot of the forward hatch when the crew came tumbling down, said "Shall I cut them down, Sir?" to which Cox replied, "It is of no use, enough of our men have been killed already." Cox then

endeavored to rally the retreating crew, but the British had thrown a grating over the hatch and their marines were shooting down it.

Cox then ran and ascended to the spar deck by the rear hatch. He fought his way forward, receiving cutlass wounds on the knee and neck, and joined the twenty-four men of the crew, half of whom were unarmed, and were huddled in the bow. Here he surrendered. Lieutenant Ludlow had been killed and Lieutenant Budd taken prisoner while Cox was on the gun deck. The reason why half of those in the bow were unarmed was that the arms for the boarders were piled in the stern where the British entered.

Let us now see what took place on the *Shannon*. When the ships struck, Captain Broke, observing the confusion on the *Chesapeake*, sprang aboard the *Chesapeake* shouting, "Follow me who can." The only opposition he met was from the chaplain of the *Chesapeake*, who had volunteered as a combatant and who had just ascended by the rear hatch.

The chaplain fired his pistol at Broke but missed, and Broke promptly almost severed the chaplain's arm with his sword. The British paused a moment to gain numbers before driving forward.

The result of this drive has been told. In all, the engagement lasted eleven minutes, five minutes of gun fire and four minutes of hand-to-hand fighting. Each ship fired four broadsides and the *Chesapeake* two extra guns. Cox and Budd were the only officers, except a few midshipmen, to come out alive.

The Shannon towed the Chesapeake to Halifax, and some months later the prisoners were exchanged.

As is customary, whenever a warship is lost, wrecked or taken under unusual circumstances, a Court of Inquiry is held. Something had to be done to appease the clamoring public and soothe the wounded vanity of the Navy. Cox was chosen as the scapegoat and in April, 1814, was tried by court-martial on four charges: cowardice, disobedience of orders, desertion from his quarters and neglect of duty, and unofficerlike conduct.

He was acquitted of cowardice, disobedience of orders and desertion from his quarters, but was found guilty of "neglect of duty" because he helped Lawrence below and "unofficerlike conduct" for not cutting down the retreating crew after the British were already in possession of the frigate.

The only defense Cox made was the statement: "I am no coward and I carried Captain Lawrence below at his own request."

His sentence was, "to be cashiered, with a perpetual incapacity to serve in the Navy of the United States."

The day after the trial, members of the court wrote Cox an apology for their action and Cox enlisted as a private in the Army. Most historians, in narrating the story of the engagement, generally refrain from mentioning Cox except to say that he carried his commanding officer below. One historian adds, "He married late in life and went west." Apparently his further history was unknown.

After his discharge from the Army Cox returned to his home in Philadelphia and in 1816 he married. As a wedding gift his father presented him with ten thousand dollars, a considerable amount in those days, to start a wholesale drug business. He remained in business in Philadelphia one year, when he and his partner divided their stock. Cox took his share to Easton, Pennsylvania, where he opened a drug store. Sometime between 1818 and 1824 he returned to Philadelphia and studied medicine with Dr. William Hewson, the elder, as his preceptor. Hewson later was one of the founders of the Jefferson Medical College and held the chair of surgery there.

Cox then returned to Easton and practiced medicine. In 1824 he decided to go abroad to continue his medical studies and to educate his six children. In the spring of that year, with his wife and children, he embarked from New York. He took a cow with him so that the children could have milk during the voyage. The cow died en route but the children survived. The year was spent in Paris, France, where Cox attended the clinic of the celebrated surgeon, Dr. Puytren. In May, 1825, he moved to Neuville, Switzerland, where he placed his children in school. There he remained until October, 1828. The years 1829 and 1830 were spent in Florence, Italy, where he rented the palace of the Duke of Tuscany, and the years 1831 to 1833 at Lausanne, Switzerland. During these latter two years he made an extensive tour of Europe with J. Fennimore Cooper. In 1834 he returned to the United States. Two more children were born in Switzerland, making eight in all.

After a short stay in Philadelphia, Cox returned to Easton where it is surmised that he resumed the practice of medicine, but this is not certain. It is known, however, that he had an interest in a cotton mill there. From 1836 to 1840 he lived on an estate which he purchased near Wilkes-Barre, apparently having given up medicine. While there he suffered severe financial losses, much of his fortune having been invested in railway stocks. He then returned to Philadelphia.

In 1850 a young nephew of Cox's, who had taken orders in the Episcopal Church, returned to Philadelphia from Wisconsin where he had been conducting a mission under Bishop Kemper, the latter having been rector of the church which Cox attended in Philadelphia. The young man gave such a glowing report on the country and of his mission that two of Cox's daughters decided to accompany him when he returned. In May of the next year the three left Pittsburgh by boat on their journey west.

At some point above Cincinnati the young clergyman fell overboard and was drowned. The two women debarked at Cincinnati and after a night spent in prayer decided to continue their journey and with their own funds complete the mission church that their cousin had planned.

The following year Cox, desiring to see his daughters, took his family to Pine Lake, Wisconsin. He liked the country, found the shooting and fishing excellent, and remained there four years. In 1856 Saint Paul, Minnesota, seemed to be a desirable place for investment and he therefore brought his family there and invested heavily in local real estate. The panic of 1857 again depleted his fortune.

Cox remained a resident of Saint Paul until his death, October 17, 1874, although he never practiced his profession there.

Thirty-two years after his death one of his grandchildren happened to read Theodore Roosevelt's "History of the Naval War of 1812" in which the following paragraph describing the engagement between the *Chesapeake* and the *Shannon* occurs: "During the engagement acting lieutenant W. S. Cox cowardly ran below, for which he was cashiered." This was the first knowledge they had that their grandfather was a participant in that battle. This also accounts for our lack of knowledge of his life, as he never spoke of his early career.

#### Bibliographic Notes

Lieutenant Budd was the principal witness against Cox. No doubt this was to save himself, as it is said that when Budd arrived on the spar deck he mistook the British for his own men.

"It was a cardinal principle of sailing tactics that when receiving an attack from to-windward a ship must not permit the enemy to get in her wake, for the reason that the latter could thus gain a position of advantage across the stem to rake; and then luffing up engage from leeward. A ship thus caught by an enemy once in her wake would be at a serious disadvan-

tage, for as Sir Howard Douglas says, 'if she tacks to avoid it (a raking from aft) she would be severely punished in stays by a fire in great part diagonal. If she hangs in stays she will be utterly destroyed and, in coming around on the other tack, she may fall off nearly end-on toward the other ship. If, on the contrary, she bear up to avoid being raked, her opponent may luff, too, and rake her before she can get away."

It is evident, then, that both Lawrence and Broke took the engagement as a duel, Broke as the challenger giving Lawrence his choice of position, and Lawrence refusing to take advantage of it.

The following, signed by William O. Stevens, Professor of Naval History in the United States Naval Academy, appeared in the New York Times, May 3, 1918:

"The death of Lawrence was a heavy loss, but the hurt anger of the country was so great that it was as well perhaps for him that he did not live to explain his defeat. The American press loudly demanded a scapegoat for the disaster, and the Navy was anxious to clear itself of the odium. Accordingly, a victim was found in the person of Acting Third Lieutenant William S. Cox.

"On April 14, 1814, a court-martial was instituted on board the frigate *United States* in New York harbor to try such officers of the *Chesapeake* as had been indicted by the court of inquiry. Stephen Decatur presided, and the members of the court included some of the most brilliant officers of the Navy. It cannot be denied, however, that the pressure of public demand for some one was strong upon them.

"Before this court Cox was arraigned on four charges: (1) cowardice; (2) disobedience of orders; (3) desertion from his quarters and neglect of duty; (4) unofficerlike conduct.

"Cox had served under Lawrence on the Argus and on the Hornet in her celebrated action with the Peacock. His conduct on these occasions won him his lieutenancy through the recommendation of his commander for whom he seems to have felt the deepest personal devotion.

"During the fight with the Shannon he was in command of a division on the gun deck. When his guns ceased to bear, most of his men left it, some to join the boarders called away to repel Captain Broke's party, others to sneak into the hold. Cox himself was not a 'boarder' but as he found himself standing by a useless gun, he joined the boarders as they rushed up to the spar deck. Just as he reached the deck, he saw his beloved commander twice wounded and falling helpless, crying to his men to 'Rush on.' He caught Lawrence in his arms and with the help of a sailor carried him down to the steerage ladder. At that point he left his burden and tried to regain the spar deck, but by that time the British had battened down the hatch. Upon discovering this he ran to one of the two guns that were serviceable and fired it, the last gun shot from the beaten ship.

"From the gun he hastened forward to try again to gain the spar deck by the forward hatch, meeting Midshipman Higgenbotham, who had just been thrown back, in an attempt to gain the deck, by the panic-stricken crew who were now piling down in heaps. On Higgenbotham's asking whether he should cut the men down with his sword, Cox replied sadly, 'It's of no use, enough of our men have been killed already.' By this time the English ensign was flying over the Chesapeake's taffrail.

"As this story came out in the trial, the first two or three charges fell to pieces. Indeed, the witnesses summoned by the prosecution refused to admit that there was anything unbecoming in the conduct of the prisoner during the action with the enemy.

"But it did not help his case for the young lieutenant to hint plainly of the chance of his being offered as a sacrifice to heal the wounded honor and reinstate the naval pride of the nation." The court was looking for flaws in his conduct and they made the most of what they found. Accordingly, he was declared guilty: First, of "neglect of duty" because he had helped Lawrence below—though Cox declared that it was at his commander's request—instead of keeping the deck.

"This was precisely what Captain Hardy did for Nelson at Trafalgar, with the difference that Hardy was in command of the ship—hardly the man to leave the deck in action—and remained several minutes in the cockpit with the Admiral. Yet no one has ever suggested cashiering Hardy for neglect of duty.

"Secondly, Cox was declared guilty of 'unofficerlike conduct' because he refused to butcher the panic-stricken men as they crowded pell-mell down the forward hatch when the ship was already in the hands of her captors. For these crimes the young officer who had fired the last shot in defense of his ship was sentenced, 'to be cashiered with a perpetual incapacity to serve in the Navy of the United States.'"



E. L. Tuoнч, M.D.
President, Minnesota State Medical Association

# President's Letter

The "torch passing" is a simple procedure with the president of your Association. The tradition of this letter is now firmly grounded. It is a courtesy extended to your president by the editors of our splendid journal. My predecessors have used this page to maintain a degree of personal touch with you; to inform you concerning administrative movements and developments vital to your interests. An exacting duty faces me to maintain the established standards of my predecessors. You need not be told that your presidents do not direct your Association. They continue their service and assist the Council in molding its policies and formulating courses of action. There is no break in continuity, therefore, with changes of administration; no cabinet turnover or inaugural parade—the new president is simply led up onto a stout platform and sworn in!

Few Association members have any true conception of the work and detail carried on by the Council. The Council is a laborious but decidedly democratic and fully representative body. It has brought about a highly efficient central office directed by Mr. Rosell and his able associates. It is regrettable that each of you cannot be made president in order to really be shown your state organization at work. Impossible, of course. (There would not be enough room in the journal anyway, for all your pictures.) Therefore, I shall attempt, from time to time, to inform you about the work of your Council and committees.

"Within the space of four years our country has produced the most colossal military machine the world have ever known." So alleges a current commentator. Within four more years we shall likely have whatever form of peace humanity (at this stage of development) is ready for. This has been a total, torturing, destructive and uprooting war. We cannot hope that the peace will be much less violent. Violence and uprooting have been visited upon doctors, and with more telling effect than on almost any other group of our citizenry. This is a fact and not a complaint. Doctors were catapulted into war. As individuals, they brought to the military service everything their own diligence, training and civilian citizenship had developed within them. The superior exhibition of these skills has been chiefly responsible for the recovery of the "ninety-seven per cent brought in alive." We are proud that American Medicine was ready for this service. Peacetime unregimented doctors have accomplished what seemed impossible. We stand with the engineers, chemists, transportation and communication experts. Home services have been strained but few neglected. Now the retreat from military regimentation to peace presents problems that may be greater than those incidental to the shift to war. Doctors, uprooted like fully grown trees, find rerooting difficult. In many regions their former patients have become like the "wandering tribes of Israel"—trekking from one defense center to another. War makes necessary centralized guidance from our national capital. Walter Ridder writes from there today, "It is far from all quiet on the Potomac; it is really confusion worse confounded." It is in such periods of turbulence that strange legislation may stem from the brains and consciousness of "star gazers" and social-service-disease-preventers. We may expect almost anything in a period so essentially revolutionary. Well, your officers stand at attention. In the coming months you will hear more and more of what a "mandated" officialdom thinks our peop

E. L. Treoling

President, Minnesota State Medical Association

CARL B. DRAKE, M.D., Editor; GEORGE EARL, M.D., HENRY L. ULRICH, M.D., Associate Editors

#### CAFFEINE AND PEPTIC ULCER

THERE is no unanimity of opinion on the part of physicians as to the advisability of prohibiting coffee and caffeine-containing beverages for peptic ulcer patients.

Recent studies, however, have brought out significant facts which indicate very definitely that caffeine is harmful for individuals who have or have had peptic ulcers.

Judd injected guinea pigs and cats intramuscularly with caffeine contained in beeswax and thereby produced gastric ulcers, although no stimulation of gastric secretion nor ulcer production was observed from caffeine injection or ingestion in dogs with Paylov stomach pouches.

Roth and Ivy\* by means of carefully controlled experiments have shown that caffeine given either orally or intravenously markedly stimulates gastric secretion in man.

After a period of fasting, the stomach was emptied and the secretion of gastric juice determined every ten minutes for a half hour. Then 200 c.c. of water with 250 mg. of sodium benzoate and 250 mg. of caffeine were introduced into the stomach, and after thirty minutes the stomach was emptied and the volume and acid concentration determined every ten minutes until the secretory response had subsided and the basal level once again was reached. Similar tests were made with sodium benzoate alone and an ordinary test meal but the response to caffeine was about two and a half that of these controls.

The significant finding was the difference in acid secretion response in different individuals. In about 85 per cent of those given 250 mg. (33/4 gr.) of caffeine (the equivalent of two cups of coffee) there was abrupt rise in the total acid secretion lasting fifty to seventy minutes; 10 per cent showed a less amount of acid secreted with a return to the basal starting point in sixty to ninety minutes; about 5 per cent showed a still more prolonged response at a high level. All but

one of thirty-six peptic ulcer patients showed a high and prolonged response. wor

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Further tests with coffee itself and beverages containing caffeine in less amount showed that they, too, stimulate gastric secretion. The average response to tea, Postum, and coffee with sugar and cream was about 60 per cent; Sanka 75 per cent and Coca-Cola 89 per cent that of clear coffee. These drinks, though low in caffeine content, all contain elements other than caffeine which stimulate stomach secretions.

Inasmuch as the acidity of the stomach has much to do with preventing the healing of peptic ulcers and may even be an important factor etiologically, the conclusion seems warranted that those who have or who have had peptic ulcers should not drink coffee, tea, or caffeine-containing drinks. It may be that those who know coffee does not "agree" with them are in the group of 5 per cent of individuals whose gastric secretion shows a high and prolonged response to caffeine. It may not be assuming too much that in some of these individuals caffeine may even contribute in the production of peptic ulcer.

## THE NATIONAL FOUNDATION FOR INFANTILE PARALYSIS

IN our January 1944 issue of MINNESOTA MED-ICINE appeared an editorial describing the nation-wide organization of the National Foundation for Infantile Paralysis and its method of attack in combating poliomyelitis. Half or more of the funds collected yearly in each county during the January campaigns culminating on the President's birthday, January 30, are allocated to the treatment of poliomyelitis victims in that county. The remainder is allocated for polio research in established medical centers and for public education. It is the avowed purpose of the Foundation that no sufferer from this disease shall lack the best treatment that medical science has to offer, and every effort is being made to discover means of prevention or specific cure.

The 1943 epidemic of poliomyelitis was bad and the 1944 worse, the latter being next to the

<sup>\*</sup>Roth, J. A. and Ivy, A. C.: The effect of caffeine on the gastric secretions in the dog, cat, and man. Am. J. Phys., 141:454 (June), 1944.
Roth, J. A., Ivy, A. C. and Atkinson, A. J.: Caffeine and "peptic" ulcer. JAMA, 126:814 (Nov. 25), 1944.

worst in history which was in 1916. Undoubtedly influenced by these facts, the public has been most generous in its contributions to the National Foundation. This year should prove no exception.

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So far, the Hennepin County unit of the Foundation has dispensed over \$20,000 for local poliomyelitis activities which includes \$15,000 for the Elizabeth Kenny Institute; \$3,500 to the Shriners Hospital, and \$1,900 to the Curative Work Shop. To date, the cost of patients from Hennepin County who had had free care in the Kenny Institute has amounted to \$16,025 so that the contribution of \$15,000 from the Hennepin County unit of the Foundation has about taken care of the free cases at the Kenny Institute.

The Ramsey County Unit of the Foundation netted over \$7,000 in 1943 and over \$12,000 in 1944. Since October 1, 1943, this unit has paid out about \$7,000 for treatment, which includes \$1.680 for a respirator and \$1,078 for three hot pack apparatuses donated to the Ancker Hospital in Saint Paul.

So far, the Foundation has granted \$492,019.15 to the University of Minnesota of which \$260,000 has been disbursed.

There is no evidence of a dearth of funds collected or spent by county units for local needs, nor in the amount allocated by the National Foundation for research by the University of Minnesota. We can only approve of the policy of the Foundation in keeping the expenditures in medical channels.

#### MORE NURSES FOR THE ARMED FORCES

The Army and Navy urgently need some 14,000 more nurses. A must order has been sent out for more enlistments at once. With the marked increase in casualties in recent weeks the need for many more nurses is imperative, if the good record of 97 per cent of casualties returned to service is to be maintained. Nothing should be allowed to interfere with giving the best possible care to our soldiers and sailors.

It is the immediate job of the State and District Committees on Procurement and Assignment Service for Nurses to provide the additional nurses at once. They cannot accomplish this difficult task without the co-operation of the public, the hospitals, and the medical profession, as well as the nursing profession.

There has been a general lack of appreciation of the nursing situation. Patients at home and in the hospitals seem to expect the same nursing care they had before 60,000 trained nurses were extracted from civilian practice. Volunteer nurses' aids and grey ladies have done valiant service in helping to maintain hospital care.

In order to obtain the additional nurses for the services, certain definite procedures will have to be taken.

The public will have to be educated to dispense with luxury nursing and get along on floor nursing in the hospital. Unnecessary hospitalization will have to be eliminated. The medical profession can do much in discouraging both luxury nursing and unnecessary hospitalization.

The use of volunteers to assist in hospital nursing will have to be expanded. It is said that only one-third of those trained and qualified as nurses' aids are helping out. This is a waste of Red Cross funds and unpatriotic.

Nurses in industry and physicians' offices will have to be released either to enter the service or to replace younger nurses in hospitals who can and should enlist.

These are *must* measures to supply the need for nurses for the armed forces. They are paramount in order that the sick and wounded soldiers and sailors may receive the care to which they are entitled.

#### DID YOU KNOW?

#### The American Red Cross Aided Last Year:

over 60,000 victims of disaster . . .

American and United Nations prisoners of war . . . (10,800,000 food parcels were shipped, and additional parcels of clothing and medical supplies)

servicemen and their families, including hospitalized veterans . . .

#### Maintained Last Year:

more than 700 clubs and rest homes overseas and nearly 200 clubmobiles, also theaters, bathing beaches, and canteens . . .

blood donor centers in 31 cities . . .

facilities in 3,748 of its 3,757 chapters to aid service-men's families . . .

## MEDICAL ECONOMICS

# Edited by the Committee on Medical Economics of the

#### Minnesota State Medical Association

George Earl, M.D., Chairman

#### NORTH CENTRAL STATES TACKLE INSURANCE PROBLEMS

The prompt establishment of prepaid medical service or indemnity insurance plans was generally recognized by the North Central Medical Conference which met in Saint Paul, December 10, as one of the most important obligations of organized medicine in this section.

Actually, insurance plans are under way or under serious consideration in every state represented in the conference, including Wisconsin, Iowa, North and South Dakota, Nebraska and Minnesota, as reports of conference members showed.

These plans are in their infancy. They contemplate limited and partial beginnings. But all of them recognize a public demand for action on a voluntary basis which will give promise, at least, of eliminating any excuse for interference by the federal government.

In Milwaukee and in one section of western Nebraska, limited plans are already under operation. In Iowa, preliminary steps have been taken by the Iowa State Medical Society for a relatively complete plan which will go into operation as soon as necessary enabling legislation has been passed. In North and South Dakota and in Minnesota similar action is under discussion for the near future.

#### Michigan's Experience Described

The first-hand report of experience with the Michigan Medical Service, made by Dr. L. Fernald Foster, secretary of the Michigan State Medical Society, was of absorbing interest, for that reason, to medical association officials from the conference states. Because Michigan Medical Service pioneered in the field and because it is now one of the largest medically sponsored services in the country, Dr. Foster's report is briefly summarized here.

"We felt in Michigan," Dr. Foster said, "That it was time for medicine to be for something, instead of opposed to every measure advanced by anybody for easing payment of medical expense.

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"We had been studying the situation in Michigan since 1925 and we had invested a total of \$20,000 in our surveys. Our first plan was not initiated, however, until passage of two enabling acts, one for group hospital and the other for group medical service in 1939. Our group hospitalization plan was the fifty-fifth to be organized and is now the second largest in the country. This plan preceded the prepayment medical service plan by one year.

#### Early Headaches

"Here are some of the headaches we encountered in our pioneering period, headaches you will be spared because you can profit by our experience. For instance, we tried to provide full coverage at first. We found, however, that full coverage meant provision for a total of no less than 9,000 different services performed by doctors of medicine. We found, also, that the volume of service demanded under a prepaid plan is four and one-half times greater than the volume under fee service. Furthermore, people actually do not want full coverage, nor do they want nursing or dental coverage. Under our full coverage plan we attracted subscribers almost overnight; but we lost a total of about \$131,000 before we learned that we must limit our coverage to surgery in the hospital, at least at the start.

"We learned, also, that there is an inevitable 'seasoning' process following enrollment, even under our surgical contract. With each new group of subscribers there is an abnormal demand for tonsillectomies and gynecological procedures. This abnormal demand hits a peak and then levels off in about a year. But the peaks, in the case of each group, go beyond the subscription rates and must be anticipated and provided for.

"We had difficulty with some of the doctors of the state, though objectors were in the minority. Only three rebel counties, out of our 55 county medical societies refused to participate at the start, though most of the individual members in those counties are accepting cases, now.

"We found, also, that we needed an experienced insurance man as our executive and we have such a man now.

"One year ago we were \$500,000 in the red, though

this indebtedness did not represent loss of capital stock. It represented unpaid bills of doctors who had contributed services under the plan. We also owed the Michigan State Medical Society \$17,500 which had been loaned to help organize the service.

"Today we are out of the red; we have paid back the loan from the state medical society in full and we have 725,000 subscribers. New subscribers are enrolling at the rate of 15,000 a month and our reserves are piling up. We plan new benefits as soon as our reserves have increased sufficiently to make them possible. First, we plan to provide medical as well as surgical service in the hospital. Second, we plan to extend our service to the self-employed and to farmers and other unorganized groups. About 83 cents out of every dollar goes back in services or indemnities to our subscribers.

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"Now as to details of operation. Michigan Hospital Service, Michigan's Blue Cross organization, handles enrollments and collections in the interest of business efficiency and because employers object to making two deductions for the two services. Two-thirds of the governing board of Michigan Medical Service consists of doctors. The other third is made up of representatives of labor, of employers and employes and of farm groups. It is not true, as has been alleged, that the CIO is operating our plan. The CIO does provide its own liaison committee, however, on a full-time basis, to aid its subscriber-members in their relations with both the medical and hospital services.

"We provide service for income groups below \$2,000, for single subscribers, and \$2,500 for subscribers and their families. We feel that indemnity insurance fails to meet the needs of the lower income groups. Beyond the limits set, we provide indemnity insurance. The arrangement appears to work well and we have found few cases among patients in the income group between \$2,000 and \$3,000 in which the doctor charged more than the fee established for lower income groups."

# Insurance Corporation Plan Presented

Conference members were interested, also, in remarks by Mr. Don Hawkins, representing the American Health Insurance Corporation. Hawkins is an expert of long experience in many types of commercial health and accident insurance; and his corporation is now prepared to underwrite indemnity insurance plans organized by medical organizations. These plans will be good anywhere in the United States and will thus meet the requirements of business firms with employes in more than one state. Furthermore, they will not entail the necessity of securing enabling legislation. The object is to help do the job where no plans are in operation or under consideration now. The company does not desire, under any circumstances, to compete with other plans.

A significant and interesting tribute was paid

by Mr. Hawkins to the Blue Cross for its accomplishments in the hospital insurance field. Commercial insurance companies got together twenty-five years ago, he said and decided that the job of providing low-cost hospital insurance could not be done by insurance. It took the Blue Cross which now has 17,000,000 subscribers to show that they were wrong and that it could be done. The same companies now have 5,000,000 subscribers of their own for comparable hospital insurance contracts and they have received more business in this type of insurance in the last two years than ever before. This business is a direct result of the pioneering of the Blue Cross.

# Medical Participation Needed

It is Mr. Hawkins' belief, in the case of medical insurance, also, that the pioneering must be done by the medical associations, even though insurance companies like his own may undertake to underwrite the plans. If the entire effort is left to the insurance companies, costs are likely to be higher, he declared, and they may increase to a point where policies cannot be sold. Furthermore, the commercial companies cannot be expected to extend coverage to dependents of subscribers, nor to employed groups of less than fifty.

Regardless of the type of plan chosen, it was Mr. Hawkins' advice to medical organizations to start on a limited basis. "You must learn to walk before you can run," he pointed out. He expressed the opinion, also, that straight indemnity insurance might well be satisfactory for a start, even in the lowest income groups, because the public is already well accustomed to the indemnity principle.

## Iowa Plan

The Iowa plan, now in process of organization, provides for service, instead of indemnity, to income groups up to \$2,000 for unmarried subscribers and \$2,500, as in Michigan, for married subscribers with dependents. The reason for that is, according to Dr. R. D. Bernard, president-elect of the state society, because the average man in the low income group wants complete protection and because it is certain that the government will propose service, not indemnities. The Iowa plan differs from the Michigan plan in that it offers medical as well as surgical and obstetrical service in the hospital; but the medical service is limited to twenty-one days and the first three days of illness are not covered. The plan is underwritten

by the Bankers' Life Insurance Company of Des Moines. It is governed by a board made up of one doctor from each district in the state, plus four others appointed from the state at large and four representative laymen. Enrollment and collections will be handled by the Blue Cross, as in Michigan. The plan may be expected to go into operation next April, Dr. Bernard said, provided the Legislature passes the necessary enabling act in the meantime and the insurance commissioner approves.

# Council Objectives

Extension of voluntary prepayment plans for medical services such as these has been announced publicly as one of the objectives of the new Council on Medical Service and Public Relations of the American Medical Association, Dr. Joseph S. Lawrence, director of the Washington Bureau, told the conference. The statement of policy embodied also an appeal for consolidation of all health activities of the federal government in one cabinet department, likewise the extension of organized public health units to all sections of the United States and improvements in the handling of medical care for the indigent and unemployed. The statement met with a surprising amount of enthusiasm and interest in Washington, Dr. Lawrence said, and he has hopes that a bill will be introduced in Congress this year calling for enactment of the legislative aspects of this program.

## FORTUNE LOOKS AT MEDICINE

U. S. Medicine took first place, even over the war and European diplomacy, in the editorial columns of many widely read publications in December, among them Time; the Saturday Evening Post and Fortune.

Undoubtedly exceptions may be taken to these editorial observations. But this stirring of editorial interest is evidence that possibilities for change in our traditional methods of delivering medical service constitute a live issue in America, today, an issue which must be reckoned with, in medical policies and plans.

Attention of medical men should be called, particularly, to the extensive article entitled "U. S. Medicine in Transition" which appeared in the December issue of *Fortune*. According to this article, medicine is definitely a social problem, like food, shelter and jobs, "because the conscience of the people has made it so." Further-

more, American health and the general condition of its medical services are nothing to cheer about, in spite of great advances, here and there. There are too many gaps and inadequacies, due, mostly, to the rapid development of auxiliary and specialized branches and the unequal distribution of doctors and hospitals. Many gaps could be closed, Fortune believes, by more general establishment of group practice, as opposed to practice by the individual doctor who does not have economical access to consultation, diagnostic facilities and even, sometimes, to hospitals.

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# **AMA** Complacent

To the American Medical Association, Fortune's observer gives credit for magnificent accomplishments in raising ethical and educational standards; but he finds the association in recent years complacently dedicated to perpetuation of the traditional as its ideal. New structural forms and new economic procedures, such as medical insurance, have only been tolerated after they have become firmly established against its opposition.

"Whenever the AMA has initiated change in economic procedure." Fortune says, "it has seemed to do so only in the hope of heading off still greater changes."

On the other hand, many localized experiments in prepayment plans by industries, co-operative groups, and latterly, by medical societies are described in detail. Some of these are thumping successes, some quick failures; but they seem to indicate to this writer that voluntary action may succeed, just possibly, in keeping the government from stepping in, providing doctors and others concerned set to work quickly and resolutely.

#### Social Inventiveness Needed

"No complicated, flexible, voluntary compromise between the status quo and state medicine will have a reasonable chance of growing to meet all unmet medical needs except under two general conditions," to quote his estimate of the situation. "The first is that the country be prosperous with reasonably full employment so that the bulk of the people are able to pay their own contributions without government help. Second, that the government, at all levels, employers, the great mass of potential patients and, above all, the medical profession, must show a degree of social inventiveness and a determination, hitherto unkown.

"If either of these two conditions is absent, the United States is probably headed through a spotty and unsatisfactory experience with voluntary medical insurance toward compulsory, nationwide insurance. The responsibility of the doctors takes the form of a dilem-

ma which they must face: if they do not themselves aggressively foster and encourage considerable reform in medical economics, they are likely to find themselves swept into something that will seem revolutionary by comparison. By one means or another, medical security is undoubtedly coming. The consumers are making a social issue of it and it will, before long, be met, socially."

## Responsibility of Doctors

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The charges of complacency and stand-patism launched upon the AMA in this article probably can be refuted; but the gravity of the responsibility confronting the doctors, even thus glibly stated, probably cannot. The writer underestimates the new currents of thought and action now stirring state and sectional components of the organization, however, and the new Council on Medical Service and Public Relations, set up as direct result of this sectional and state activity. The vigor of this activity was evident in the discussions which took place at the North Central Conference in Saint Paul. It gives a more hopeful promise than Fortune envisioned for a successful issue in the contest between voluntary action and government compulsion in the field of medical service.

### WORD OF APPRECIATION\*

The Minnesota State Medical Association demonstrated a splendid spirit of co-operation with the dental profession when it adopted a resolution at its annual meeting in Rochester endorsing the Navy bill H.R. 4216 which has for its objective the creation of a separate department for the Dental Corps of the Navy. This action indicates Minnesota medicine believes in the profession of dentistry and respects its ability and desire to administer its own corps in the military services.

to administer its own corps in the military services. The Legislative Committee of the American Dental Association found this resolution extremely valuable in its efforts to secure favorable recognition of the bill. Its publication immediately attracted widespread attention even amongst congressmen, for the opinion prevailed that medical men would be reticent about endorsing the objectives of the bill. At the hearing before the Naval Affairs Committee of the House of Representatives the Honorable Congressman Maas introduced the resolution into the records to substantiate his statement that the entire medical profession of our state endorsed the bill.

The Minnesota State Medical Association did a unique and courageous act in adopting the resolution, but in so doing they demonstrated not only to our professions but to legislators and military administrators as well, that, in Minnesota, medicine and dentistry are in complete accord.

It was with considerable pride that the State Dental Association announced the adoption of this resolution. The many complimentary comments which have come to us in praise of the medical profession of our state for their interest, understanding and generosity towards the problems of dentistry should warm the hearts of those who were instrumental in creating the resolution.

The position of the Minnesota State Medical and Dental Associations has been greatly enhanced throughout our nation by this action. Minnesota dentists are grateful and wish to express through North-West Dentistry this word of appreciation to Medicine.

CARL O. FLAGSTAD

# MINNESOTA STATE BOARD OF MEDICAL EXAMINERS

Julian F. Dubois, M.D., Secretary

Saint Paul Physician's License Suspended for Three Years

In the Matter of the Revocation of the License of Milton C. Wolf, M.D.

On November 10, 1944, following a hearing, the Minnesota State Board of Medical Examiners suspended, for a period of three years, the license to practice medicine formerly held by Milton C. Wolf, M.D. Dr. Wolf, for many years, was associated with the Heidelberg Medical Institute at 195 E. 7th Street, Saint Paul. In recent years the place has been known as the Mid-West Clinic.

Dr. Wolf's license was suspended following a complaint that he had obtained \$74.00 in advance, from a twenty-six-year-old male patient who had gone to Dr. Wolf complaining of pain in the lower part of his back. The patient testified at a hearing before the Minnesota State Board of Medical Examiners, that he was questioned, at length, by an unlicensed associate of Dr. Wolf's in reference to sexual matters and lost manhood, notwithstanding the fact that the patient stated that he had been employed for four and one-half years in a foundry and had injured his back. The patient further testified that he was advised the usual charge was \$150 as a down payment and \$5.00 per week for treatments, but in his case the charge would be only \$100 plus the charge for weekly treatments, and a guarantee "that he would be a man again." During the investigation by Mr. Brist on behalf of the Minnesota State Board of Medical Examiners, the money was returned to the patient.

patient.

Dr. Wolf was born in Chicago in 1876, and graduated from the Medical School of Physicians and Surgeons of Chicago, in 1898. He was licensed in Minnesota in 1905 by examination. Dr. Wolf previously had been warned by the State Board of Medical Examiners with respect to his practice at the Heidelberg Medical Institute and the Mid-West Clinic.

#### Ousted Chiropractor Returned to Minneapolis Workhouse

Re State of Minnesota vs. Michael J. Koehler

On November 28, 1944, Judge Levi M. Hall of the Hennepin county district court signed an order returning Michael J. Koehler, forty-seven years of age, 321 Kresge Building, Minneapolis, to the Minneapolis workhouse to serve ten and one-half months remaining of a one-year sentence imposed July 6 for criminal abortion. Koehler had been released from the workhouse October 20 after serving only forty-two days of his one-year sentence on his lawyer's claim that Koehler was suffering from diabetes and chronic bronchitis and had to be under the care of his private physician.

Koehler was prosecuted after a joint investigation by the Women's Bureau of the Minneapolis Police Department and the Minnesota State Board of Medical Examiners in May, 1944. The investigation disclosed that Koehler was in the abortion racket. Koehler pleaded guilty July 6 but received two stays of sentence until

<sup>\*</sup>From the October issue of North-West Dentistry published quarterly by the Minnesota State Dental Association.

September 7. The facts in Koehler's case were reported by the Minnesota State Board of Medical Examiners to the State Board of Chiropractic Examiners with the result that on September 6 Koehler's chiropractic license was revoked.

Koehler has a previous criminal record, having pleaded guilty May 24, 1939, in the district court of Hennepin County to a charge of having in his possession instruments, articles and medicine for the causing of unlawful abortion. At that time he paid a fine of \$150 and was also given a one-year suspended sentence in the workhouse.

In the present case the Women's Bureau of the Minneapolis Police Department discovered that seventeen days after getting out of the workhouse Koehler was examining a woman patient at his old stand in the Kresge Building, and offering to do another criminal abortion for \$200. The matter was taken up with Michael J. Dillon, county attorney who asked Judge Hall to return Koehler to the workhouse.

# Duluth Woman Sentenced to Two-Year Term for Abortion

Re State of Minnesota vs. Laura Weckler, also known as Laura McLean

On December 12, 1944, Laura Weckler, also known as Laura McLean, sixty years of age, was sentenced by the Hon. Mark Nolan, Judge of the District Court at Duluth, to a term of two years in the Women's Reformatory at Shakopee. The defendant was arrested on September 29, 1944, at her home on the old North Shore Road a few miles out from Duluth, charged with the crime of abortion, following a joint investigation by the sheriff of St. Louis County, and the Minnesota State Board of Medical Examiners. Upon being arraigned in the Duluth Municipal Court, the defendant waived a preliminary hearing and was held to the District Court under bail of \$1500, which she did not furnish. After being in the County Jail for two months, Mrs. Weckler entered a plea of guilty on November 29, and the Court continued the matter to December 11, to permit a thorough medical examination of the defendant. On December 12, sentence was imposed by

The defendant stated she was born at Tuscola, Michigan, and had lived in Duluth for over twenty-five years. The defendant has a previous criminal record, having been sentenced at Duluth on October 9, 1941, to a term of fifteen months in the Women's Reformatory at Shakopee, for the crime of abortion. In 1929, the defendant was twice convicted at Duluth, of violating the liquor laws, paying a \$100 fine on one occasion, and being sentenced to sixty days in jail for a second violation. At the time of her last arrest the defendant was found to be in possession of various instruments used in the performing of abortions, including catherers and elm stick. A patient was also found at the defendant's place who, upon being questioned, admitted that she had gone there for the purpose of arranging for a criminal abortion.

#### Minneapolis Woman Sentenced to Two-Year Term for Illegal Possession of Morphine

Re State of Minnesota vs. Florence B. Brooks

On December 14, 1944, Florence B. Brooks, thirty-seven years of age, 1819 Bryant Avenue North, Minneapolis, entered a plea of guilty in the District Court of Hennepin County, to an information charging her with the crime of illegally possessing narcotic drugs. The defendant was sentenced by the Hon. Paul S. Carroll, Judge of the District Court, to a term of two years in the Women's Reformatory at Shakopee, the sentence being stayed for a period of three years upon condi-

tion that the defendant enter Minneapolis General Hospital for treatment for her drug addiction and that she remain there until discharged, as cured, and that she thereafter abide by the rules and regulations of the Probation Officer of Hennepin County. The County Attorney's Office and a representative of the Minnesota State Board of Medical Examiners concurred in this disposition of the case.

disposition of the case.

The defendant was arrested on November 4, 1944, by agents of the Federal Bureau of Narcotics as she was leaving the office of a Minneapolis physician, who had furnished her with sixty ½ grain morphine sulphate hypodermic tablets and twenty-five ½ grain morphine sulphate hypodermic tablets for \$5.00. When questioned the defendant denied that she had any narcotic drugs on her person, but upon being taken to the women's quarters of the Minneapolis City Jail where she was searched, it was discovered that she had the above

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The physician in question in this case was warned in January, 1943, by the Supervisor of the Federal Bureau of Narcotics in Minneapolis, and a representative of the State Board of Medical Examiners, to refrain from furnishing this defendant with any morphine or any of the derivatives of opium under any circumstances whatsoever. That warning was given when it was discovered that the same physician had furnished the defendant with forty-nine prescriptions calling for a total of 1800 ½ grain morphine sulphate hypodermic tablets in a period of four months from September 10, 1942, to January 11, 1943; a total of 900 full grains, or approximately 225 full grains per month, or 7½ full grains per day. Notwithstanding the physician's agreement not to furnish any of the derivatives of opium to this defendant, it was discovered that not long thereafter Florence Brooks was obtaining morphine and dilaudid from this physician, who was now dispensing it to her

rather than writing prescriptions for it.

Florence Brooks, who has also been known by the name of Halpern, previously pleaded guilty on April 5, 1940, in the Municipal Court of Minneapolis to a charge of violating the City Drug Ordinance in the obtaining of paregoric. At that time she was sentenced to ninety days in the Minneapolis Workhouse; the sentence was stayed for three days and the defendant placed on probation for 1 year. The very next day the defendant was again arrested by Federal Narcotic Agents and on April 9, 1940, was sentenced to thirty days in the Minneapolis Workhouse in addition to the previous ninety-day sentence. The Minnesota State Board of Medical Examiners has ordered the issuance of a citation for the physician in this case to show cause why his license should not be revoked. The matter will be heard at the next meeting of the Medical Board.

#### South Saint Paul Osteopath Sentenced to One-Year Term in County Jail

Re State of Minnesota vs. Paul A. Reilly

On December 16, 1944, Paul A. Reilly, forty-nine years of age, was sentenced in the District Court at Hastings, Minnesota, to a term of one year in the Dakota County Jail. Reilly, a former licensed osteopath in South Saint Paul, had pleaded guilty on May 20, 1944, to an information charging him with the crime of abortion. At the time of entering his plea of guilty, Reilly surrendered in Court his basic science certificate and his osteopathic license, for cancellation. Both have since been cancelled by the respective Boards.

Judge W. A. Schultz, upon recommendation of Mr. Vance B. Grannis, County Attorney of Dakota County, and Mr. Brist, attorney for the State Board of Medical Examiners, sentenced the defendant to a term of one year in the Dakota County jail and placed the defendant on probation for a like period of time after the Court was informed that the defendant had closed his office, and his licenses were permanently revoked.

# MINNESOTA STATE BOARD OF MEDICAL EXAMINERS

Julian F. DuBois, M.D., Secretary

Physicians Licensed November 10, 1944 **Special August Examination** (August 29, 30, 31, 1944)

AHRENS, CURTIS FRANK, U. of Minn., M.B. 1944, Minneapolis Gen. Hospital, Minneapolis 15, Minn. AMATUZIO, DONALD STANLEY, U. of Minn., M.B. 1944, 120 N. 57th Ave. W., Duluth, Minn. ANDERSON, CHESTER ALBERT, U. of Minn., M.B. 1944, 2008 Grand Ave., Saint Paul 5, Minn. ANDERSON, WERNER WILLARD, U. of Minn., M.B. 1944, 1115 Pine St. S. E. Rrainerd Minn.

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æ, Œ BARRON, SHOLOM STEVEN, U. of Minn., M.B. 1944, 1733 Pinehurst Ave., Saint Paul 5, Minn. BENSON, ELLIS STARBRANCH, U. of Minn., M.B. 1944, Cincinnati Gen. Hospital, Cincinnati, Ohio

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# Minneapolis Surgical Society

Meeting of October 5, 1944

The President, Daniel MacDonald, M.D., in the Chair

## SCALENUS ANTICUS SYNDROME

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## Abstract

## ARTHUR F. BRATRUD, M.D. Minneapolis, Minnesota

One of the most common causes of disability of the upper extremities, where pain, motor and vascular disturbances are present, is the scalenus anticus syndrome. It is not recognized nearly as frequently as it should be, but with the increasing knowledge of this syndrome as a clinical entity, diagnosis of it should not be difficult.

Symptoms may be present from a period of a few weeks to a number of years. The most frequent symptoms are: pain in the region of the shoulder which may radiate down the arm, forearm and to the hand, or posteriorly to the region of the scapula or anteriorly to the region of the chest.

Vascular and vasomotor disturbances may be associated with pain. These consist of edema and cyanosis and may even lead to gangrene in the peripheral distribution of the vessels as a result of obstructed flow of blood to the part.

Motor and sensory disturbances may be associated and reach the stage where it causes incapacitation of the individual.

Various names have been given to the syndrome. Naffsiger limits the scalenus syndrome to individuals suffering from brachial neuritis. Cervico-brachial syndrome does not define the disease, but it does give a comprehensive and anatomic concept which is accurate and inclusive. Under this heading the syndrome may be classified under three general headings.

- 1. Individuals exhibiting neurologic symptoms.
- 2. Those with vascular symptoms.
- 3. Those who exhibit a combination of neurologic and vascular symptoms. This latter has been termed neuro-circulatory-compression syndrome by some men. This aptly describes the underlying pathological anatomy. Every sufferer manifests symptoms which are characteristic of the causative factor. The pathologic reaction in the anatomic tissues to either intermittent or long-continued compression will result in symptoms peculiar to their function. In the nerve this results in pain, numbness, paresthesia paralysis and loss of function. In the vascular structures, it results in pain and vascular symptoms: edema, swelling, cyanosis and even gangrene in the peripheral distribution, as a result of obstructed flow of blood to the part. Anatomy of the region is described as well as the surgical treatment for relief-where such form of treatment is required.

In the differential diagnosis the following conditions must be considered and discussed: neurosis, arthritis,

tumor of the lungs, supraspinatus tear and injury to the long head of the biceps muscle.

The syndrome is of particular interest, for a very large percentage of cases follow injury or trauma to the shoulder. Numerous instances have been reported in obstetrical cases and also following surgery where the patient has been placed in an exaggerated Trendelenburg position.

It is not necessary that cervical ribs be present to produce the typical picture and it is very seldom the excision of the rib is indicated where surgery is necessary. Section of the scalenus anticus muscle gives relief in nearly all cases and the improvement or results are usually very rapid, being noticed within twenty-four hours in some cases.

Seven patients with the syndrome were submitted to surgery, one having had both sides operated upon. The duration of symptoms varied from a period of a few months to ten years. The results were good in all cases except one and this patient had marked relief of pain in the extremity, but still complained after two years of some pain in the region of the shoulder.

#### Discussion

DR. MARTIN NORDLAND: I enjoyed listening to Doctor Bratrud's excellent presentation of this subject. He has covered the subject very well. I should like only to add a few practical points. Patients with this disturbance are not rare, but they occur seldom enough in the average surgeon's experience so that they are not readily recognized. It has been stated that they occur in about 1 per cent of all patients who come for examination. It has further been noted that about 70 per cent of individuals with this disturbance have bilateral affliction. It seems that women have the disturbance in proportion of three to one as compared to men, and fourth decades. Probably because of the lack of muscular tone in women approaching the fortieth year, this disturbance is found more often in women. It has been noted that when the disturbance is single that it occurs more often on the right side than on the left side. This probably is explained by the fact that more people are right handed, and therefore the increased activity of this member over the left, aggravates the symptoms. This would also explain the fact that the symptoms are more prominent late in the day. Anatomically it has been noted that the nerves are closer to the ribs on the right side, and that the subclavian artery is higher on the right. While this disturbance may be relatively congenital in its origin, it is reasonable to presume that nerve compression is better borne in the earlier periods of life.

The size of the rib is not important. A fibrous band is many times the cause of compression on the brachial plexus and on the subclavian artery. The symptoms are due to pressure on the lowest cord of the brachial plexus. The symptoms should suggest the lesion. In the more severe cases the hand becomes blue. Pressure on the blood supply would explain this. Both the motor and sensory nerves are affected. Numbness is present,

and in the untreated cases, atrophy occasionally develops. Many patients find from experience that they are much more comfortable sitting in the arm chair; any mechanical support which elevates the arm gives relief.

The diagnosis of scalenus anticus syndrome should be considered when the symptoms which I have related are present. Pain is not necessarily present, but usually is. With motor and sensory disturbances, numb-With motor and sensory disturbances, numbness, and atrophy, the diagnosis should be quite plain, even without x-ray. Naturally the presence of these symptoms with a corroboratory evidence of the x-ray the diagnosis should not be difficult. A very good aid in diagnosis in the early stages is to ask the patient to raise the arm above the head. The pulse, which is normally present when the hand is down, disappears or becomes quite weak when the hand is elevated above the head. Since the section of the scalenus anticus muscle was instituted by Adson, the treatment has become relatively simple. There should be practically no complications in the surgical treatment of this disturbance. I must, however, mention the complications which occurred in my own experience in dealing with this disturbance. In one case I accidently nicked the subclavian artery. Those of you who know what it means to expose the subclavian artery for this operation will realize what would happen under such circumstances. The wound filled rapidly with frothy blood, and I was considerably concerned for some moments. Repair was made and the patient made a good recovery. In another patient with bilateral symptoms, the pleura of the apex of each lung was accidently torn. As each apex was injured, the patient suddenly became cyanosed. Anesthesia with a gas mask renders this relatively safe, however. The pleura was repaired on each side and the patient made a good recovery. I believe this diagnosis would be made more often if the clinician were more conscious of the possibilities.

Dr. WILLIAM P. PEYTON: I would like to say something about terminology. I have regarded scalenus anticus syndrome to be a group of symptoms simulating those produced by a cervical rib but in which there is no cervical rib present. This syndrome is much more rare than are cases with symptoms from a cervical rib. Since January, 1941, we have had on the neurosurgical service at the University Hospital only two cases of scalenus anticus syndrome but in the same period we have had nine cases with similar symptoms in which a cervical rib was demonstrated by roentgenology.

Under this classification I find that the diagnosis of scalenus anticus syndrome may be an extremely difficult diagnosis to make.

It may simulate many conditions, some of which Dr. Bratrud has mentioned but in addition there are others such as progressive muscular atrophy, Guillian-Barre syndrome (encephalo-myelo radiculitis), lateral rupture of a cervical intervertebral disc, spinal cord tumor in the cervical region, or neurofibroma of a cervical nerve.

It is difficult to explain the dilatation of the subclavian artery that is sometimes found lateral to the scalenus anterior muscle. I have considered this as being due to decreased blood flow in the vasa vasorum in this part of the artery but another possible cause is compression of the subclavian artery between the first rib and the clavicle in which case the dilatation is proximal to the point of compression as one would expect.

Similar compression of the subclavian vein between the first rib and the clavicle would explain the venous obstruction occasionally seen in cervical rib or scalenus anticus syndrome. Since the vein runs anterior to the scalenus anterior muscle it cannot be compressed by this muscle.

We observed a boy with bilateral scalenus anticus syndrome. He habitually assumed a slouching position and if he straightened up into good posture an attack was immediately precipitated. In the course of five minutes after the erect posture was assumed all the veins in his hands would dilate.

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There has been a tendency to explain all the vascular disturbances as being due to vasomotor disturbances. If this were true sympathetic nerve block should always eliminate them. Compression of the vessels between the clavicle and the first rib seems to be more

The result following operation as Dr. Bratrud has shown is good.

# THE CRITERIA OF A SATISFACTORY OPERA-TION FOR ULCER AND CAUSES OF FAILURE AFTER GASTRIC RESECTION FOR ULCER

OWEN H. WANGENSTEEN, M.D. Minneapolis, Minnesota

The objectives of a satisfactory operation for ulcer are: (1) subjective relief of symptoms; (2) ablation of the ulcer diathesis and prevention of recurrent ulcer; (3) accomplishment of these objectives with minimal risk and without compromising the future for the patient. Such a procedure envisages: (1) extensive gastric (three-quarter) resection; (2) removal of the antrum; (3) removal of the lesser curvature; and (4) completion of the operation by the establishment of a gastrojejunal stroma with a short afferent duodenal loop, the anastomosis being made at or just proximal to the ligament of Treitz. Surgeons who propose to do these operations, in the interests of a low operative mortality must learn: (1) to master the technique of satisfactory duodenal inversion; (2) to effect the anastomosis with a minimal inversion of tissue in order to preserve a large efferent outlet from the stomach as well as a patulous afferent inlet to it.

In this clinic, at any rate, the bleeding ulcer appears to be a more serious problem than the perforated ulcer. A policy of operating upon such patients before their condition becomes critical undoubtedly will diminish deaths from hemorrhage. Such operations are trying at best and should be undertaken only by those prepared to deal with the exigencies of a gastric resection under difficult circumstances. Even superficial gastric erosions may provoke serious or even fatal hemorrhage.

## Importance of the Vascular Factor

The importance of local impairment of blood flow to the stomach and duodenum is cited as a likely cause rendering the mucosa more susceptible to injury by the acid-peptic digestive juice. Severe gastric hemorrhage has been observed in a patient with arterial thrombosis of the intramural gastric vessels with calcification. Erosions and ulcers can be produced in the experimental animal by fat embolism; the fat plugs the end vessel in the mucosa which then succumbs to the acidpeptic digestive action of the gastric secretion. Further, ulcers and erosions can be produced also in the

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gastric mucosa of animals by the production of chronic arterial spasm, achieved by implanting pitressin or adrenalin in beeswax.

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#### Recurrent Stomal Ulcer After Resection

Four patients, who had undergone resection elsewhere, have been seen in this clinic during the past two years. The causes of recurrent stomal ulcer in these patients fall essentially into the following groups, listed in the order of their importance:

1. The most frequent cause is failure to resect enough stomach. In unobstructed stomachs, the usual weight of the resected specimen removed at the time of gastric resection averages about 185 grams. In three of the patients in this group, the weight of the gastric tissue removed at the time of the second resection was approximately that amount, indicating that the extent of the resection at the first operation was inadequate. Inasmuch as it was necessary to remove so much gastric tissue to leave the customary 25 per cent sized gastric pouch, it is not unlikely that the patients had large stomachs occasioned by pyloric obstruction at the time of the first operation.

2. Employing too long an afferent loop in the gastrojejunal anastomosis invites recurrent stomal ulcer. In
this laboratory, the validity of the thesis that a short
afferent loop is important in thwarting recurrent ulcer
after gastric resection has been established. The manner in which the long afferent loop predisposes to recurrent stomal ulcer is that it shunts the secretion from
the residual gastric pouch from the richest secretinbearing area of the bowel, viz.: the duodenum and the
upper jejunum. After gastric resection, made at the
ligament of Treitz or just proximal to it, the regurgitation of barium into the blind proximal duodenal loop
is visualized quite regularly on roentgen examination,
suggesting that the opportunity for absorption of secretin from the duodenal mucosa is operating in the
normal manner.

3. Failure to excise the antral mucosa completely invites recurrence of gastrojejunal ulcer. In two of these four patients this factor was a contributing cause. That this cause alone may be responsible for recurrent ulcer in patients who have had an otherwise satisfactory gastric resection would appear to have been established. Previously two patients were reported from this clinic who had undergone the three-quarter resection; however, owing to the difficulties presented by an inflammatory mass at the pyloric outlet, the prepyloric antral segment was left; stomal ulcer developed and in one patient, its excision effected a cure; in the other, reresection was carried out after excision of the antral segment with complete relief of symptoms.

4. Failure to excise the lesser curvature completely may invite recurrent stomal ulcer. The lesser curvature, like the antrum and the first portion of the duodenum, is unrugated and presents a relatively smooth mucosal surface. Such smooth unrugated surfaces are constantly exposed to the acid-peptic digestive action of gastric juice and have far less opportunity to escape

than highly rugated surfaces such as the fundic or corporic mucosa. The capacity of the rugated mucosa to move on the muscularis mucosa is well known; thereby, its folds escape constant submersion beneath the acid-peptic digestive fluid. Furthermore, complete excision of the lesser curvature provides the surgeon with the opportunity to remove a good portion of the vagal influence to the residual gastric pouch, thereby lessening materially psychic stimulation of gastric secretion.

#### Comment

In this clinic, we have been unable to produce recurrent stomal ulcer with the provoking stimulus of histamine in beeswax, after the three-quarter gastric resection employing a short afferent duodenal loop. On the contrary, in gastric resections of less than 50 per cent, recurrent ulcer develops quite regularly when such animals are subjected to the stimulating effect of histamine in beeswax.\* Moreover, if a three-quarter resection is performed employing a long afferent loop, recurrent stomal ulcer may develop spontaneously or be provoked by the daily implantation of histamine in beeswax.\*

In this clinic the uniform success of the three-quarter gastric resection in thwarting the recurrent ulcer diathesis in a long list of resection cases, totaling more than 350 patients, suggests that intractable or incurable recurrent ulcer is a myth. Only recently, however, I have had a single recurrence in a man upon whom a gastric resection was done by me in May of this year for a gastrojejunal ulcer following a gastrojejunostomy. The removed segment of stomach together with 6 centimeters of jejunum weighed only 155 grams-probably therefore only about 140 grams after deducting the weight of the 6 centimeters of jejunum. The man was hypersthenic in build and somewhat adipose. In addition, he has been an inveterate smoker, smoking daily between three and four packages of cigarettes. Though nicotine probably has little influence upon gastric secretion, it does influence blood flow in an important manner. It is not unlikely that this man had a situation akin to chronic arterial spasm produced by the continual smoking. He has become so much addicted to nicotine that he has been unable to quit the use of tobacco wholly; nevertheless, his improvement since cutting down materially on cigarette smoking has ameliorated his symptoms considerably with cessation of pain and hemorrhage. If the gastric resection in this instance had been more extensive, the patient probably could have tolerated the chronic arterial spasm provoked by nicotine, and, as was related above, erosions and ulcer may be produced by conditions which provoke spasm.

The occurrence of a recurrent stomal ulcer in this patient suggests the importance of meeting adequately the criterial of a satisfactory operation for ulcer.

#### Discussion

Dr. L. C. Culligan: I always enjoy hearing Doctor Wangensteen talk. He has a way of presenting his facts in a clear logical manner that is convincing. I

<sup>\*</sup>Proc. Soc. Exp. Biol. & Med., 56:231, 1944. \$Bull. Minnesota M. Found., 4:82, (May) 1944.

<sup>†</sup>Arch. Surgery, 44:489, (March) 1942.

frequently attend the surgical clinics at the University Hospital and always come away feeling that I have learned something. I was over there this morning watching Doctor Wangensteen resect a gastrojejunal ulcer. I think that we should often take advantage of this excellent opportunity of seeing gastric and other

difficult surgery done beautifully.

As the years roll on and we are better able to evaluate in the light of time the work that Doctor Wangensteen and his associates are doing, we will realize that he has made two outstanding contributions to gastric surgery. First, he has placed the operation of resection for ulcer on a physiological basis, and as a result bids fair to do away with the great nemesis of gastric surgeons—gastrojejunal ulcer. Up to the present time one had to be a real optimist to feel that the surgical treatment of ulcer was particularly suc-cessful. Before I left the Veterans' Hospital, I made a study of the results of sixteen years of gastric surgery at that institution, estimating our results on how often it was necessary for these patients to return to the hospital for treatment after they had been operated upon. Sixty-six per cent of the pyloroplasties returned for further treatment. Thirty-eight per cent of our gastroenterostomies returned with gastric symptoms. Sixteen and eight-tenths per cent of seventy-three resections returned with gastrojejunal ulcer, hemorrhages or other symptoms. Five of these resections, earlier ones which Five of these resections, earlier ones which symptoms. were done between the years 1927 and 1931, all or 100 per cent returned with symptoms. In contrast with these results, twenty patients who had a resection for gastric ulcer were apparently cured for none of these returned for treatment. This makes us feel that our figures are fairly accurate.

I think that our results were comparable to those that surgeons are getting generally. In 1942, Kiefer, reviewing the results of 173 resections for ulcer done at the Lahey Clinic, reported twenty, or 11 per cent, that subsequently developed gastrojejunal ulcers or severe hemorrhages. In the light of Doctor Wangen-steen's insistance that the stoma of the resection be placed as close as possible to the duodenum, using a very short or no loop posterior anastomosis, it is interesting to analyze these twenty cases from the Lahey Sixteen of these resections were done by the anterior method which means an anastomosis well down on the jejunum some distance from the duodenum. Three of the resections, where the posterior type of anastomosis was done, were of the Finsterer exclusion type of resection wherein the distal end of the stomach together with the antral mucosa was left. A very high incidence of gastrojejunal ulcer almost invariably follows this procedure unless the antral mucosa is removed at the time. In one case it did not state whether the anastomosis was of the anterior or posterior type.

Doctor Wangensteen now reports 350 carefully-followed resections with only one probable gastrojejunal ulcer. I know that he will be the first to agree that the time element is not sufficiently long to be sure that this good record is going to keep up forever, but certainly it begins to look as though he is on the right

track.

The second real contribution that Doctor Wangensteen has made is the development of the aseptic gastric resection. In my opinion this is the most effective means that we have for the prevention of peritonitis following resection, and its use is to be particularly

urged in resection for carcinoma.

There are those that contend that the aseptic or closed resection has no place in gastric surgery, and that all postoperative peritonitis is due to postoperative leakage from the suture lines of the anastomosis or from leakage from the duodenal stump. While no one will argue that peritonitis is not caused from leakage from suture lines, inasmuch as peritonitis follows resection for carcinoma many times oftener than resection for ulcer it must follow, if their contention is true, that car-

cinoma resections leak much oftener than do resections for ulcer. This may or may not be true. There may be something about the carcinoma patient that he does not knit as readily as does the ulcer patient. I do not know if there is anyone that has the answer to that. However on the other side of the argument is the well-established fact that the stomach contents of 90 per cent of carcinoma patients are septic, and the stomach contents of 75 per cent of duodenal ulcer patients are sterile. It seems to me that this fact must be given thoughtful consideration as being the chief etiological factor in the development of postoperative peritonitis and is the reason that peritonitis follows resection for carcinoma so much more frequently than it does resection for ulcer. If such is the case, the surgeon using the open method is not giving his patient all the protection that he is entitled to. That sepsis and contamination at the time of surgery is the real factor in the cause of postoperative peritonitis seems to be supported by the fact that in the resections which we have done for carcinoma since we started using the aseptic resection at the Veterans Hospital, we have had no peritonitis and no leakage, and Doctor Wangensteen has done approximately one hundred and fifty resections for carcinoma using the aseptic technique with only one death from peri-This was due to leakage from a duodenal stump.

Last winter I was talking before the St. Paul Surgical Society on the subject of the aseptic resection. In discussing my paper, Doctor Colvin began with the statement that there is no such thing as an aseptic resection. I agreed with him. No matter how carefully one opens the bowel even with the cautery, I do not doubt but that cultures will always show a few organisms. In fact I would go farther than Doctor Colvin and say that there is no such thing as aseptic surgery A few months ago Doctor Howes of New York, who I think has done as much work on wound healing as anyone in this country, made the statement at the surgical conference at the University of Minnesota that no matter how carefully one sterilizes the skin before operation, as soon as the incision is made, immediately we have a contaminated wound. I do not think that anyone would argue from this that we should stop trying to cleanse the skin as well as we know how. Not at all. We all know that if we take care of the gross contamination that the body can handle the slight. The same is true of the peritoneal cavity. If we protect it from the ninety-nine bacteria, nature will look

after the hundredth.

I would like to show a few slides that demonstrate the precautions that we take to prevent obstruction to the proximal jejunal loop and blowouts of the duodenal

stump.

Obstruction of the afferent loop with resulting increased pressure in the duodenum and proximal jejunum is due principally to one of three causes. The first is kinking at the junction of the stoma and the proximal loop. The second is edema and swelling at this point that may occur during the first few days postoperatively. The third is slipping of the stoma up through the opening in the transverse mesocolon with resultant constriction of either the afferent or efferent loop, or both.

We aim to prevent the first of these complications by a maneuver that rotates the stomach so that instead of it lying in its customary transverse direction, it is held in an anteroposterior direction. This is accomplished by suturing the lesser curvature of the stomach to a point in the posterior mid-point of the opening in the transverse mesocolon. This rotates and holds the lesser curvature posteriorly. The greater curvature is rotated and sutured anteriorly. This position is maintained by several more interrupted sutures joining the opening in the transverse mesocolon to the stomach. When this is done the proximal jejunum, as it comes forward from the ligament of Treitz, can join into the cut end of the stomach comfortably without twisting or kinking.

(Continued on Page 70)



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# SEARLE

JANUARY, 1945

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(Continued from Page 68)

Edema and swelling of the proximal stoma can be overcome by the introduction of a naso-suction tube 'through the stoma into the proximal loop. We attach a metallic bucket onto the end of this tube. This can be palpated through the stomach wall and can be milked down through the stoma and 3 or 4 inches into the afferent loop without breaking the aseptic technique.

Slipping of the stoma up through the opening in the transverse mesocolon can be prevented by the careful application of the sutures joining the opening in the transverse mesocolon to the wall of the stomach. These should be placed 1.5 to 2 inches above the stoma. We have found that if these sutures are placed from above before the stoma is pulled through the rent in the mesocolon that this procedure is much easier and can be accomplished more thoroughly than when one tries to put them in after the stoma is pulled down through this opening. For this we use interrupted silk sutures. All of these are placed before any is tied. The stoma is then pulled through the opening and the sutures are tied from above.

Dr. Owen H. Wangensteen: We are all aware of the fine work that Doctor Culligan is doing in this type of surgery. I must confess that I feel very much flattered to note that Doctor Culligan interests himself so seriously in the problem of aseptic gastric resection. This method of operation has been used continuously now at the University Hospitals since June, 1938.

With refernce to the problem of gastric ulcer, there has been in recent years a definite swing toward earlier operation in all patients with recurrent or persistent defects. The difficulty is that, in some instances it is impossible to say with certainty whether an ulcer or cancer is present. And it is not well to allow this uncertainty to be resolved by the elapse of time. In pre-pyloric defects particularly, the incidence of carcinoma is frequent enough to warrant anyone responsible for the disposition of the case looking questioningly at prolonged conservative treatment, in the presence of persistent defect. My experience suggests that prepyloric defects are malignant in approximately 20 per cent of instances—an incidence which suggests the wisdom of early operation. Even higher on the lesser curvature, at or above the sulcus angularis, the ability of anyone, employing all the pre-operative diagnostic criteria avail-able, to distinguish benign and malignant ulcers is far able, to distinguish beingi and manginal dicers is far from infallible. Anyone who affects to be able to do so arrogates to himself an extension of vision which only the microscope affords. True enough, in certain instances, benign gastric ulcer may become malignant, an occurrence to which Wilson and MacCarthy gave considerable emphasis many years ago. The more important consideration is, however, that in instances of persistent gastric ulcer, earlier recourse should be had to gastric resection, permitting microscopic examination to resolve the confusion as to whether the lesion is benign or malignant. Inasmuch as gastric resection can be done in experienced hands at a risk not exceeding 2 per cent in resections of election, there should be less hesistancy on the part of physicians to have patients with persistent gastric defects of dubious nature undergo operation.

Dr. Orwood J. Campbell: How often does anemia develop in patients with extensive gastric resection?

DR. WANGENSTEEN: Our experience is that secondary anemia in patients undergoing resection for ulcer is unusual. Approximately four years ago, when Castle of Harvard, who discovered the intrinsic factor in the gastric mucosa, was here, he reviewed this very question. He said that inasmuch as the intrinsic factor in man resides largely in the fundic mucosa, the part of the stomach which remains, the occurrence of anemias after this type of resection would be unlikely. Experience has borne out Castle's prediction. However, I do have one patient for whom total gastric excision was done for carcinoma of the stomach five years ago, who does have pernicious anemia. Meulengracht of Copenhagen you will remember found the intrinsic factor in the gastric mucosa of the pig to be present in the antrum. In man, however, as Castle has shown, it is present largely in the fundic mucosa.

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There is a symptom-complex which occurs in some patients after gastric resection which merits attention. I refer to the symptoms provoked by quick emptying of the stomach. Normally the stomach with an intact pylorus empties only in jets. After gastric resection, the stomach empties very rapidly. Owing to the distension of the duodenum and jejunum resulting therefrom, the patient may have gas pains and even nausea unless he eats slowly. After the elapse of a few weeks, however, the patient's jejunum usually accommodates itself to the rapid reception of food. In the meantime, however, the patient must be cautioned to eat and drink slowly to avoid the distress of rapid distension of the jejunum occasioned by the quick dumping of the stomach. We have also been interested to observe that some patients after gastric resection insist they cannot drink milk. Whether this is a physiologic or a psychologic phenomenon, we are proposing to explore.

Dr. CHARLES E. MERKERT: Do patients have diarrhea from quick emptying of the stomach following these gastrectomies?

DR. WANGENSTEEN: In my experience, diarrhea after gastric resection for ulcer is unusual. The patients in whom we observe it rather commonly as a physiologic phenomenon are those who have undergone hemicolectomy for carcinoma of the cecum. Water is absorbed largely in the terminal ileum and the right colon dries the fecal content a little more. When the surgeon, in his anxiety to effect complete lymph node removal, excises the terminal two or three feet of the ileum, as well as the right colon, temporary diarrhea is not uncommon.

The meeting adjourned.

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#### EDWARD I. BROWN

Dr. Edward I. Brown, Saint Paul, was born in Morpeth, England, on April 21, 1869. He came to the United States in the year 1890, locating in Saint Paul and working as a clerk while going to night school. In 1896, he was admitted to Hamline University Medical School, from which institution he graduated as an M.D. in 1900. In that year he started to practice medicine in Saint Paul and was a member of the Bethesda Hospital staff for over thirty years.

Because of failing health, Dr. Brown retired from active practice of medicine about two years ago. On September 25, 1944, he suffered a massive stroke of apoplexy from which he died October 8, 1944, at the age of seventy-five years.

Dr. Brown was a member of the Minnesota State Medical Association, the Ramsey County Medical Society and the Phi Rho Sigma Fraternity.

He is survived by one son, Archie Brown of Michigan; two grandchildren; two sisters, Mrs. Hewetson of England and Mrs. J. F. Drake of British Columbia; three brothers, David of Sarnia, Ontario, William and John of Newcastle-on-Tyne, England, a host of patients and friends. Burial was at Roselawn Cemetery, Saint Paul, October 10, 1944.

E. G. Sterner, M.D.

## E. P. CHRISTENSEN

Dr. E. P. Christensen of Two Harbors, Minnesota, died November 10, 1944, at the age of sixty-four. He had retired from active service November 1, 1944, following sale of the Two Harbors Hospital to the County Health Center.

Dr. Christensen was born in Ludington, Michigan, April 25, 1880. He attended Kalamazoo College at Kalamazoo for two years before he studied medicine at Rush Medical School, graduating in 1906. He took his internship at Presbyterian Hospital in Chicago.

He came to Two Harbors in 1907 and was associated with Dr. J. D. Budd. When Dr. Budd retired, Dr. Christensen and Dr. Burns bought the hospital, and later on at the retirement of Dr. Burns, Dr. Christensen and Dr. Wilbur became associated in its management.

Dr. Christensen served as first president of the Rotary Club, as council member, city and county physician, and chief surgeon for the D. M. and I. R. Railway. He was a member of the Masonic Blue Lodge, Scottish Rite, Shrine, and Jester, honorary society.

Dr. Christensen was a member of the St. Louis County Medical Society, Minnesota State and American Medical Associations. He is survived by his wife and two sons, Dr. Bud Christensen of Oakland, California, and Lt. Edward Christensen, serving at Mare Island.

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## HERBERT DAVIS

Dr. Herbert Davis, in practice in Saint Paul since 1888, died November 16, 1944, at the age of eighty-five. He was active until the day of his death. Rit

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Herbert Davis was born on a farm near Oshkosh, Wisconsin, April 14, 1859. His father, James Davis, came from New York in 1850, and took up a homestead in Wisconsin. His mother was a great lover of books and people, and was the one who gave him his greatest encouragement to study medicine.

He attended the country school and later the Normal School at Oshkosh. His M.D. degree was obtained at Rush Medical School in Chicago in 1880 when he was twenty-one years old.

Upon graduation he obtained a post as company physician with the Jackson Mining Company at Naugonee, Michigan. Then began a friendship with William M. Olcott and Penticost Mitchell who were clerks in the drug store below his office and who later became president and vice president, respectively, of the Oliver Mining Company of Duluth. This friendship continued after he was transferred to Fayette, Michigan, and to Two Harbors, Minnesota, and when he left the employ of the Mining Company to begin private practice, he tried to locate in Duluth to be near his two friends. Unable to find a house in Duluth, he came to Saint Paul in 1888.

Dr. Davis lived first on Pleasant Avenue and opened an office on Selby Avenue having to climb Selby hill to reach his office. Soon, however, he shared an office

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in the Moore Block at Seven Corners with Dr. Parks Ritchie, and began building one of the largest general practices in the city. When the Lowry Medical Arts Building was built he moved and shared offices at different times with Dr. Alexander Colvin, Dr. Paul Cook, Dr. Carl Teisberg, Dr. F. H. Neher and, since 1920, with Dr. John S. Abbott.

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Dr. Davis was made General Examiner in Saint Paul for the Northwestern Mutual Life Insurance Company of Milwaukee in 1899 and held that position until his death. During this long period he is said to have made some 12,000 examinations.

He was a member of the Minnesota Academy of Medicine, the Ramsey County Medical Society, the Minnesota State and American Medical Associations.

He was an ardent hunter and rarely missed a season until this year. He found time for almost daily games of pool at the Minnesota Club and weekly games of poker.

He was family doctor to many families during his many years of practice and brought many children into the world before he gave up obstetrics in his later years. His good judgment and pleasing manner endeared him to his many patients. He devoted his life to his profession, starting the day early to make his calls, and was always concerned about the welfare of his patients.

Dr. Davis married Jennie Wallace of Clinton, Ontario, in 1883. Their oldest child, Lucile (Mrs. John M. Harrison) died in 1933. His widow, daughter Marguerite, and son Wallace, a veteran of World War I, are still living.

### C. FRANCIS EWING

Dr. C. F. Ewing, a pioneer physician of Wheaton, Minn., died November 28, 1944, at the age of seventytwo.

Dr. Ewing was born in Angola, Indiana, October 26, 1872. He received his preliminary education in the Angola schools and his degree of B.S. at the Tristate College in Angola in 1892. He obtained his M.D. degree at the University of Minnesota Medical School in 1901.

Previous to coming to Wheaton forty years ago, Dr. Ewing practiced at Anoka for three years. He operated a private hospital at Wheaton for thirty-five years and was surgeon for the Milwaukee and Great Northern Railways.

Dr. Ewing took a prominent part in the community life of Wheaton and was an enthusiastic golfer, a skillful hunter, a fisherman, and a gun fancier. He was of a benevolent nature and made many friends. He was an advocate of all the progressive movements to improve his community and section of the country.

He was a member of the West Central County Medical Society, the Minnesota State and American Medical Associations.

## ERNEST L. MELAND

Dr. Ernest L. Meland, well-known urologist of Minneapolis, died December 3, 1944, at his home. He was forty-three years old.

Dr. Meland was born at Pelican Rapids, Minnesota,

JANUARY, 1945

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# How-

 By making YOUR reservation at the Palmer House NOW! January 15, 1901. He studied three years at St. Olaf's College, Northfield, Minnesota, and was in the 1925 medical school class at the University of Minnesota. He served as intern in the Minneapolis General Hospital in 1926 and practiced in Dalton and Fergus Falls, Minnesota, before entering the Mayo Foundation as a Fellow in Urology in August, 1929. On receiving the degree of M. S. in Urology in 1932, he moved to Minneapolis.

He was clinical assistant professor of surgery of the University of Minnesota, member of the American Urological Association, the Hennepin County Medical Society, the Minnesota State and American Medical Associations, and at the time of his death was secretary of the Alumni Association of the Mayo Foundation.

#### FRANCIS EDMUND MINGO

Dr. Francis E. Mingo of Hugo, Minnesota, died October 29, 1944, at the age of sixty-three.

Dr. Mingo was born August 16, 1881, at Glencoe, Minnesota, attended public schools at Centerville, near White Bear, Minnesota, and graduated from Central High School in Minneapolis in 1902. He graduated from Hamline Medical School in 1905.

Dr. Mingo practiced at Hugo for twenty-eight years and was a member of the Washington County Medical Society, the Minnesota State and American Medical Associations. He was local Health Officer.

He is survived by several children—Ruth, Gertrude, Philemon, Corporal Ignatius and Sgt. Alcuin Mingo, and also by a sister, Mrs. A. Aubin, of Minneapolis.

#### REUBEN M. PEDERSON

Dr. Reuben M. Pederson, of Minneapolis, died November 20, 1944, at the age of sixty-four.

Dr. Pederson was born at Hanley Falls, Minnesota, March 11, 1880. He obtained his B.A. degree from Augsburg College in Minneapolis in 1902, and his M.D. degree from University of Minnesota Medical School in 1906. Following graduation he interned at Swedish Hospital in Minneapolis. He took postgraduate work at New York University in 1914, and at Tulane University, New Orleans, in 1915. He served in the Army Medical Corps from 1916 to 1919 as a Lieutenant Colonel.

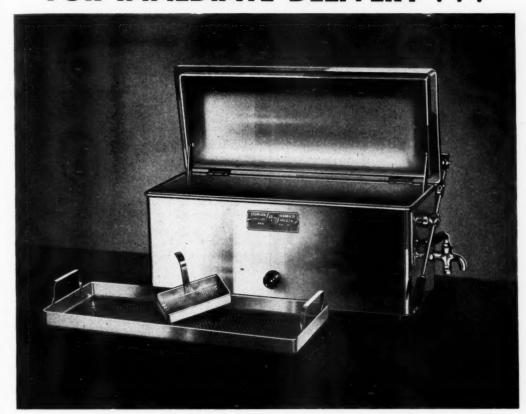
Dr. Pederson was a member of the Cataract Masonic Lodge, Scottish Rite, Zuhrah Temple, Hennepin County Medical Society, Minnesota State and American Medical Associations, and the American College of Surgeons. He was also a member of the Minneapolis Athletic Club and Minneapolis Elks Lodge.

### CLARENCE ADDISON RATHBUN

Dr. C. A. Rathbun, a St. Cloud physician and surgeon for thirty years, was shot and killed November 15, 1944, when a deer hunter mistook him for a deer. He was hunting in Maple Grove township in northern Becker County at the time.

Dr. Rathbun was born December 14, 1891, at Rice, (Continued on Page 76)

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# (Continued from Page 74)

Minnesota. He obtained his M.D. degree at Loyola Medical School in Chicago in 1914. He took postgraduate work in surgery in 1922 at the Chicago Postgraduate Medical School.

Following graduation, he practiced at Sauk Rapids, Minnesota, for two years. He was in the Army for eighteen months during World War I, and practiced in Nebraska one year before moving to St. Cloud.

Dr. Rathbun was a member of Stearns-Benton County Medical Society, the Minnesota State and American Medical Associations.

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#### ELMER JOHN TIEDEMANN

Dr. E. J. Tiedemann of Adrian, Minnesota, died October 28, 1944, at the age of eighty-three.

He was born at Mauston, Juneau County, Wisconsin, August 10, 1861. At one time he held an appointment at the U. S. Marine Hospital at La Crosse, Wisconsin, but practiced at Adrian from 1918 until a few weeks before his death.

Dr. Tiedemann lost his wife in 1936. He is survived by a son, Dr. Ian Tiedemann of Glendale, California, and a daughter, Mrs. Leander Kramer of Odrian.

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Dr. Frederick N. Solem, of Spicer, has been appointed to the staff of the State Hospital in Walker.

Dr. J. J. Morrow, after many years of practice in Austin, has gone to the Pacific Coast, where he plans to make his home.

Lt. Colonel B. B. Cochrane, Saint Paul, is now the Commanding Officer of the 7th Medical Battalion, attached to the 7th Division.

Dr. John S. Abbott has closed his office in the Lowry Medical Arts Building, Saint Paul, to take a position at the Veterans' Hospital, Fort Snelling.

Pfc. Vacil Kalinoff, son of Dr. and Mrs. D. Kalinoff of Stillwater, was slightly wounded in action in France on November 19, 1944. He is now in England.

Dr. Herman Juergens, of Belle Plaine, was painfully burned when an alcohol lamp with which he was lighting a cigaret exploded, throwing the flaming fluid in his face.

\* \* \*

Dr. M. I. Howard, of the Mankato Clinic, spent November in Chicago, doing postgraduate work at the Cook County Postgraduate School of Medicine and Surgery.

A paper entitled "Penicillin: Its Use in Pediatrics" was given by Dr. W. A. Herrell, of the Mayo Clinic, at the meeting of the American Academy of Pediatrics in St. Louis.

Dr. R. B. Kirklin, of the Mayo Clinic, made two addresses at the recent meeting of the Toledo Academy of Medicine held in Toledo as a memorial to Dr. John Murphy.

Dr. Roy A. Lundblad, recently released from the armed services after twenty-six months of duty, has returned to Minneapolis and opened offices in the Medical Arts Building.

Dr. C. E. McNaught, of St. James, who served with the air service command at Wichita, Kansas, in 1942 and 1943, has closed his offices temporarily and returned to the air service.

the National Venereal Disease Control Conference in November at St. Louis, where he reported the first

Dr. Paul A. O'Leary, of the Mayo Clinic, attended year's observation of penicillin therapy.

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Dr. R. G. Lee, of Baudette, has been confined to his home as the result of a sudden heart attack. While Dr. Lee's condition was not regarded as serious, complete rest in bed for some weeks was prescribed.

Colonel Richard B. Hullsiek of Saint Paul, formerly medical officer in charge of the draft in Minnesota, is now the Executive Officer with the 8th Convalescent Hospital in Northern France.

Captain Thomas J. Kenyon, formerly pathologist at St. Joseph's Hospital, Saint Paul, is now Chief of the Laboratory Service at the Northington General Hospital, Tuscaloosa, Alabama.

The name of Kenneth Frederick Ernst of Minneapolis is among those who recently received promotions from Lieutenant Colonel to Coloniel in the Army Medical Corps, as announced by the Surgeon General.

Drs. Kennedy, Logan, and Aldrich, of the Mayo Clinic, attended the meeting of the American Academy of Pediatrics held in St. Louis in November. Dr. Kennedy is chairman of the Minnesota division of the Academy.

Dr. L. A. Buie, of the Mayo Clinic, recently spent a week in the East, visiting clinics in Boston, New York

and Philadelphia. He also addressed the Columbia Medical Society at their meeting on November 13 in Columbia, South Carolina.

Lieut. Col. George A. Williamson has been Chief of the Orthopaedic Section of the Madigan General Hospital, Fort Lewis, Washington, since July, 1944, when he was transferred from DeWitt General Hospital in California.

Captain L. J. Kucera who, prior to his enlistment in the Army Medical Corps in 1942, practiced medicine in Lonsdale, has been promoted to the rank of Major. Major Kucera is in charge of the induction center at Fort Logan, Colorado.

Dr. Andrew Sinamark, of the Morsman Clinic, Hibbing, was elected president of the Range Medical Association at their meeting in Eveleth in December. Dr. Bray, of Biwabik, was made vice president, and Dr. Frank Bachnik, of Hibbing, secretary and treasurer.

The public library at Madelia has been presented with a number of books dedicated to the memory of Dr. W. J. McCarthy. The donor was A. L. Sperry, Owa-

(Continued on Page 82)

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Dr. M. J. Lindahl, Sherburn, suffered a concussion which rendered him unconscious for several hours when his car skidded on the icy pavement just north of Sherburn, Although his head was severely bruised, x-rays revealed no fracture.

Dr. Mary Ghostly, of Lake Julia Sanatorium, and Drs. D. F. McCann, E. W. Johnson, and Percy Watson, of Bemidji, attended the meeting of the Upper Mississippi Medical Society held at the State Sanatorium at Ah-Gwah-Ching.

"The Syndrome of Physical Allergy as it Affects the Nose, Throat, and Ears," and "Chemotherapy in Otolaryngology" were the subjects of addresses given by Dr. H. L. Williams, of the Mayo Clinic, before the Dallas Academy of Ophthalmology and Otolaryngology in Dallas, Texas, in November.

Dr. Kenneth W. Covey has purchased the practice and equipment of Dr. J. J. Ederer in Manohmen and opened offices in the Berge Building there. Dr. Covey, the son of Dr. W. C. Covey, a Bagley dentist, is a graduate of the Minnesota University and served his internship at St. Barnabas Hospital in Minneapolis.

Under the direction of Dr. O. L. McHaffie, Dr. Karl Emanuel, and Dr. S. N. Litman, the present medical staff of the Webber Hospital in West Duluth, which discontinued operation on December 1, will conduct a clinic on the first floor of the building. Dr. Edwin Webber, founder of the hospital, died in January, 1944.

Dr. J. Arnold Bolz, having been honorably discharged from the United States Naval Reserve, is now associated with the Itasca Clinic in Grand Rapids. A native of Elgin, Illinois, Dr. Bolz is a graduate of the University of Chicago and served his internship at the University Hospital in Minneapolis.

Dr. Kenneth A. Peterson, son of Dr. R. A. Peterson, of Vesta, who recently completed his officer's training at the medical Field Service School, Carlisle Barracks, Pennsylvania, has been commissioned a first lieutenant Before his induction into the Army, Lieutenant Peterson was in medical practice in Minneapolis.

A certified copy of the citation conferred on Major L. A. Smith has been received by his wife, who is superintendent of nurses at the Tyler hospital. The citation was for the Bronze Star, presented to Major Smith for exceptionally meritorious services with the armed forces in the European theater.

Dr. Stanley R. Maxeiner, of Minneapolis, in collaboration with Lt. Colonel Harr E. Bundy, of the United States Veterans Administration, Minneapolis, presented a paper on "Islet Tumors of the Pancreas" before the Western Surgical Association which met in Chicago during the first week in December.

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Announcement has been made of the marriage on December 13 of Miss Mary Huberty, of Hawley, to Nels John Thysell, Lt. (jg) USNR, son of Dr. and Mrs. F. A. Thysell, of Moorhead. Lt. Thysell, who is stationed at the Orange County Hospital, Orange, California, is a graduate of the University of Minnesota Medical College and a member of Nu Sigma Nu.

Dr. McIndoe, a former fellow in surgery at the Mayo Foundation, who has been practicing medicine in London for the past fourteen years, has been honored with conference of the titles, "Commander of the British Empire" and "Officer of the Order of the White Lion, Czechoslovakia." Dr. McIndoe is also a holder of the William White Scholarship.

Plans are being perfected for the establishment of a fellowship in urological research at the Minnesota School of Medicine as a memorial to Dr. Ernest Meland, Edina, who died in his forty-third year on December 3, 1944. Dr. Meland was nationally known for his notable contributions to the study of urological diseases. Dr. J. K. Anderson, president of the Hennepin County Medical Society, is chairman of the committee for raising funds, and James Baker is the treasurer.

Dr. A. C. Stahr has taken over the practice at Hopkins, Minnesota, of Dr. R. H. Picha, who was inducted into military service on November 15. Dr. Stahr took his medical degree in 1938 at the University of Minnesota. His internship at the Jersey City Medical Center, Jersey City, N. J., was followed by three and a half years in the Navy. After his discharge he was associated with the Saint Paul Clinic for eight months. For the past year and a half he has been connected with the urology section of the surgical department at the University of Minnesota.

Dr. Daniel C. Gates, Minneapolis, who has been serving as assistant to the director of the office of Community War Services, a Federal Security Agency, has been appointed city director of health education. The position is one of the three recently created on the recommendation of Dr. J. F. Hill, city health director in Minneapolis.

Dr. Gates, who holds both a master's and a doctor's degree in public health from the University of Michigan, came to Minneapolis in 1941 as secretary of the health and medical care section of the Council of Social Agencies.

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# \* Reports and Announcements \*

### MEDICAL BROADCAST FOR JANUARY

The following radio schedule of talks on medical and dental subjects by William O'Brien, M.D., Director of Postgraduate Medical Education, University of Minnesota, is sponsored by the Minnesota State Medical Association, the Minnesota State Dental Association, the Minnesota Hospital Association and the University of Minnesota School of the Air.

| Jan. | 3-11:00  | A.M. | (WLB)      | Fats and Oils                      |
|------|----------|------|------------|------------------------------------|
| Jan. | 6- 9:15  | A.M. | (WCCO)     | *Reducing Maternal<br>Deaths       |
| Jan. | 6-11:30  | A.M. | (WLB-KROC) | Medicine in the News               |
| Jan. | 10-11:00 | A.M. | (WLB)      | Protein Requirements for<br>Growth |
| Jan. | 13- 9:15 | A.M. | (WCCO)     | *Saving New Born Babies            |
| Jan. | 13-11:30 | A.M. | (WLB-KROC) | Medicine in the News               |
| Jan. | 17-11:00 | A.M. | (WLB)      | Water Balance                      |
| Jan. | 20- 9:15 | A.M. | (WCCO)     | *Infant Care in First Year         |
| Jan. | 20-11:30 | A.M. | (WLB-KROC) | Medicine in the News               |
| Jan. | 22- 4:15 | P.M. | (WCCO)     | Your Hospital in War-<br>Time      |
| Jan. | 24-11:00 | A.M. | (WLB)      | Milk, The Ideal Food               |
| Jan. | 27- 9:15 | A.M. | (WCCO)     | *Dental Care in Pregnan-<br>cy     |
| lan. | 27-11:30 | A.M. | (WLB-KROC) | Medicine in the News               |

<sup>\*</sup>Keyed with subject of the month-Minnesota State Medical Association Packet of Information for Members.

Disorders of Nutrition

# SECOND ANNUAL CHICAGO MEDICAL SOCIETY CLINICAL CONFERENCE

Jan. 31-11:00 A.M. (WLB)

The Chicago Medical Society is holding its Second Annual Clinical Conference at the Palmer House, Chicago, on February 27-28 and March 1, 1945. The sponsoring of this annual clinical conference for physicians of the Middle West has become an important function of the Chicago Medical Society following its inauguration last spring.

The program of these three days, of intensive post-graduate medical education, will be replete with the names of widely known and well recognized, local and national, medical educators, men who will present a wide variety of currently interesting medical topics. The program being arranged will be of real interest to all physicians, general practitioners and specialists alike. The presentations will begin at 8:00 A.M. and will continue all day throughout the three days, with a special program Tuesday evening and a well-planned banquet program Wednesday evening.

Hotel reservation should be made with the Palmer House, Chicago, at once.

### NATIONAL CONFERENCE ON MEDICAL SERVICE

The National Conference on Medical Service will be held Sunday, February 11, 1945, in the Red Lacquer Room of the Palmer House, Chicago, Illinois. Registration will precede the morning session which will open at 9:00 o'clock. More time than usual has been set

aside for questions and informal discussion, and everyone attending is urged to participate.

The conference theme, "Distribution of Medical Care," will be presented in its various aspects in the following program:

### Morning Session-9:00 A.M.

President's Address—Medicine and the National Crisis— C. L. Palmer, M.D., Pittsburgh

What Labor Expects from Medicine—WALTER REUTHER, Vice President, United Auto Workers, CIO, Detroit What the Farmer Expects from Medicine—ROGER C. CORBETT, Ph.D., Secretary, American Farm Bureau, Chicago

What the Insurance Man Expects from Medicine— HARLAN S. Don CARLOS, Manager, Life, Accident and Group Claim Department, The Travelers' Insurance Company, Hartford, Connecticut

Open Discussion

#### Noon Luncheon-12:00 M

(Wartime regulations make it impossible for hotels to serve Sunday luncheon for conference. Regular dining room facilities of hotel will be available.)

## Afternoon session 1:45 P.M.

The Miller Bills and Medical Legislation by Congress
—The Honorable A. L. Miller, Washington, D. C.,
Congressman from Fourth District, Nebraska

Ouestions and Answers

Public Relations Program of the American Medical Association—JOHN FITZGIBBON, M.D., Chairman of the Council on Medical Service and Public Relations, AMA, Portland, Oregon

Changes in the Attitude of Medical Officers toward Medical Education and Practice—Lt. Col. Harold C. Lueth, M.C., Liaison Officer, Surgeon General and AMA, Chicago

Discussion

Prepayment Medical Insurance Plans

Service vs. Indemnity Type of Insurance. (Open discussion.) Moderator—Creighton Barker, M.D., Secretary, Connecticut State Medical Association, New Haven.

### MINNESOTA SOCIETY OF INTERNAL MEDICINE

At the annual meeting of the Minnesota Society of Internal Medicine held at Rochester, Minnesota, in October, Dr. Harry Oerting of Saint Paul was elected president, Dr. Reuben A. Johnson of Minneapolis, vice president, and Dr. Alex Brown of Rochester, secretary-treasurer.

# MINNESOTA SOCIETY OF NEUROLOGY AND PSYCHIATRY

The Minnesota Society of Neurology and Psychiatry held the first regular meeting of the year on January 9 at the Minnesota Club in Saint Paul. Dinner was served at 6:30 p.m. Dr. Hewitt B. Hannah discussed "Two Cases of Brain Abscess with Complete Recovery," and Dr. Harold Noran, "Intracranial Vascular Tumors and Malformations." The latter was an inaugural thesis.

Dr. James W. Kernohan was elected president for 1945.



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#### RAMSEY COUNTY MEDICAL SOCIETY

Ramsey County Medical Society held the final meeting of the year on December 18, 1944, in the auditorium in the Lowry Medical Arts Building. Dr. J. A. Lepak, retiring president, presided. The speakers for the evening were Drs. Robert Rosenthal, John Meade, and Alfred Hoff. Dr. Rosenthal covered children's diseases and the specialized science of pediatrics, with analysis of the first book written on the subject and published by the author, the Italian physician, Paulus Bagellardus, in 1478. Dr. Meade spoke on "Diuretics and the Treatment of Heart Diseases with and without Clinical Edema." Dr. Hoff discussed "Diagnosis and Treatment of Atypical Pneumonia."

Officers serving for 1945 are: President, Dr. Justus Ohage; Vice President, Dr. James J. Swendson; Secretary-Treasurer, Dr. C. K. Williams. Dr. Harry B. Zimmermann is president-elect.

### ST. LOUIS COUNTY MEDICAL SOCIETY

Dr. W. J. Ryan, Duluth, president of the St. Louis County Medical Society, began his term of office at the annual meeting held at the Northland Country Club on December 14. Officers elected were: Dr. P. J. Boman, Duluth, president-elect; Dr. T. A. Estrem, Hibbing, vice president, and Dr. R. P. Buckley, Duluth, secretary-treasurer. Drs. A. G. Athens, Richard Bardon, and O. L. McHaffie were appointed on the Judicial Committee, and Drs. P. F. Eckman, F. N. Knapp, and R. J. Moe, on the Economics Committee. Drs. R. B. Bray and Clarence Jacobson were named delegates to the Minnesota State Medical Association, with Drs. G. A. Hedberg and Andrew Sinamark as alternates.

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Dr. C. J. Wilson, professor of medicine, University of Minnesota Medical School, talked on "Postwar Trends in Medical Education," stressing the need of postgraduate opportunities for physicians on their return from military service. Dr. Wilson also discussed "Hepatitis."

## UPPER MISSISSIPPI MEDICAL SOCIETY

The winter meeting of the Upper Mississippi Medical Society, held at the State Sanatorium at Ah-Gwah-Ching, was addressed by Drs. E. R. Crow and F. F. Callahan, of the sanatorium, and Dr. T. J. Kinsella, of Minneapolis. Dr. Crow spoke on "Nontuberculous Patients at the Sanatorium" and Dr. Callahan discussed "Tuberculosis and the Family Doctor." Dr. Kinsella's subject was "Surgical Conditions of the Heart."

### WASHINGTON COUNTY MEDICAL SOCIETY

At the annual meeting of the Washington County Medical Society on December 12, 1944, all officers for 1944 were re-elected unanimously for 1945. Committee appointments will also remain the same for 1945.

The guest speaker, Philip Donohue, M.D., of Saint Paul, gave an elucidating talk on "Urinary Obstruction in Childhood."